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**ACQUISITION REFORM:
EXPERIMENTATION AND AGILITY**

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
ONE HUNDRED FOURTEENTH CONGRESS
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ACQUISITION REFORM: EXPERIMENTATION AND AGILITY

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
Washington, DC, Thursday, January 7, 2016.

The committee met, pursuant to call, at 10:02 a.m., in room 2118, Rayburn House Office Building, Hon. William M. "Mac" Thornberry (chairman of the committee) presiding.

OPENING STATEMENT OF HON. WILLIAM M. "MAC" THORN-BERRY, A REPRESENTATIVE FROM TEXAS, CHAIRMAN, COMMITTEE ON ARMED SERVICES

The CHAIRMAN. The committee will come to order.

The committee begins 2016 continuing to focus our attention on defense reform to help ensure that the U.S. military is agile enough to meet the extraordinary demands of a complex, dangerous, rapidly changing world. Last year's NDAA [National Defense Authorization Act] included important first steps in our long-term effort to reform the way the Pentagon buys goods and services. In 2016, we will build on those efforts.

Technology and threats are both evolving very rapidly. Our own acquisition system too often undermines our ability to get the war-fighter what he or she needs to meet and counter those threats. Generating and validating requirements, budgeting for funds, and contracting can each take two or more years, even before major acquisition programs are initiated. After major acquisition programs begin, it takes 8 to 9 years on average before systems are developed and deployed to warfighters. We cannot have an agile system if it takes us years to figure out what we want, how to fund it, who to hire even before development begins.

Today's hearing is intended to examine a number of questions and topics but especially focusing on whether experimentation and prototyping new capabilities offers a means of improving agility, and what successes the military has had with experimentation as well as what obstacles the Pentagon has encountered.

And it seems to me that as one examines periods of the past where there was significant innovation in military, experimentation was a key element, in some ways maybe even the heart of that innovation. And it is, I think, a very critical component of where the United States needs to go.

Mr. Smith.

[The prepared statement of Mr. Thornberry can be found in the Appendix on page 47.]

**STATEMENT OF HON. ADAM SMITH, A REPRESENTATIVE FROM
WASHINGTON, RANKING MEMBER, COMMITTEE ON ARMED
SERVICES**

Mr. SMITH. Thank you, Mr. Chairman. I thank you for both having this hearing and for your leadership on acquisition reform. As you mentioned, in last year's bill a number of changes were made in the area of acquisition, and I think you correctly state the need.

We have, well, more equipment that we need to buy than we have money to buy it. The next decade is going to be a major challenge for the Pentagon no matter what with major systems that need to be replaced or upgraded and a budget that is less than we had hoped it would be and may even be less still. So if we can buy that more efficiently, more quickly, at a lower cost, that is better.

But the challenges, you know, are in some cases, I think, difficult to overcome. And we can all sort of give the basic acquisition reform speech, which is, you know, we need to buy it more quickly; it needs to be upgradeable; we need to make decisions more quickly.

But let's look at the reasons why we don't. You know, certainly part of it is the bureaucracy, and we can look at working on that. But part of it also is just the rapidly changing nature of technology.

If you decide, okay, boom, right now, we are going to get this in 2 years, and in the middle of that process, there is some significant upgrade in a critical technology to the piece of equipment you are building, are you better to simply build what you did, accept good enough, or to try to incorporate in those new technologies that make it and improve it?

That is not an easy decision to make. It is the nature of the world we live in, and I don't think any acquisition reform process is necessarily going to change that. What I am most interested in is how we can more empower the individuals at the Pentagon to make those decisions with fewer layers of bureaucracy because one thing that does slow down the process is the number of people that have to approve a program. And it becomes sort of a, you know, vicious cycle. The programs take so long that you have more and different people in charge or a part of them, and everyone has got a slightly different way of looking at it when they become in charge, so it changes more and more as you go forward.

So what I would hope to do is to be able to empower individuals, program managers, to make quicker decisions to move forward. But if we are going to do that—is the last thing I will say—we also have to allow them to make mistakes.

And I think that is one of the biggest reasons that we have the acquisition nightmare that we have, is if a program is purchased and it doesn't work out and it becomes too costly, everybody is outraged. And there are all kinds of exposés. And what do we do? We say, well, we have got to have more oversight. You know, we have got to make sure we don't make these mistakes again. And what more oversight means is more people, more time, and a slower process. So we really have to make the choice and say that—you know, Silicon Valley loves to say that one of their great things is they tolerate failure because they know that is part of the experimentation process.

We need to learn how to do that a little bit at the Pentagon, empower people, make decisions, understanding they will make mistakes, but putting six layers of bureaucracy over the top of them isn't going to eliminate the mistakes and is only going to make the process more costly and more lengthy as well.

So it is a difficult challenge, one that I am aware we will not be able to legislate a magic fix for, but we want to figure out what we can do to help. So I look forward to your comments today that will help guide us in that process.

[The prepared statement of Mr. Smith can be found in the Appendix on page 48.]

The CHAIRMAN. We are fortunate to be joined today by General Michael E. Williamson, the Principal Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics, and Technology; the Honorable Sean Stackley, Assistant Secretary of the Navy for Research, Development, and Acquisition; and Mr. Richard W. Lombardi, acting Assistant Secretary of the Air Force for Acquisition.

Again, thank you all for being here. Without objection, your full written statements will be made part of the record, and each of you will be recognized to summarize your comments.

General, please proceed.

STATEMENT OF LTG MICHAEL E. WILLIAMSON, USA, PRINCIPAL MILITARY DEPUTY TO THE ASSISTANT SECRETARY OF THE ARMY FOR ACQUISITION, LOGISTICS, AND TECHNOLOGY, U.S. ARMY

General WILLIAMSON. Chairman Thornberry, Ranking Member Smith, and distinguished members of the Armed Services Committee, in the interest of time, I will just make a few comments. But I would like to start by first thanking you for your continuing engagement with the Army on acquisition reform. This is really about, how do we get capability to our soldiers quickly, really, the right equipment at the right time.

I also want to thank you for the legislation that supports attracting, training, and retaining quality acquisition professionals. At the end of the day, program success is tied to having qualified people managing and running those programs.

I respectfully request that my written statement be made a part of the record. In it, I discuss a couple of key areas: First, modular open systems architecture; the Army's ongoing evaluation and experimentation programs and initiatives; and, really, our efforts to build a technologically superior force. That can only be accomplished by having an acquisition system that is responsive and agile.

I think Mr. Smith's comment is really important: technologies will continue to change. So one of the things that I have been following this week is the Consumer Electronics Show out in Las Vegas, and what concerns me about that is the tremendous amount of technology that our potential adversaries now have access to. And so having an agile acquisition system, one that allows us to not just meet the current set of capabilities but also find technologies that give us a competitive advantage, overmatch capability becomes critical.

Mr. Chairman, distinguished members of the committee, let me take this opportunity to thank you again for your steadfast and strong support to the outstanding men and women of the United States Army, our Army civilians, and our families. This concludes my opening remarks, and I look forward to your questions.

[The prepared statement of General Williamson can be found in the Appendix on page 49.]

The CHAIRMAN. Mr. Stackley.

STATEMENT OF HON. SEAN J. STACKLEY, ASSISTANT SECRETARY OF THE NAVY (RESEARCH, DEVELOPMENT, AND ACQUISITION), U.S. NAVY

Secretary STACKLEY. Chairman Thornberry, Ranking Member Smith, distinguished members of the Armed Services Committee, thank you for the opportunity to appear before you today to discuss Department of the Navy, Marine Corps acquisition, and our efforts to improve agility and experimentation.

Your Navy and Marine Corps have a rich history of pushing the boundaries of science and technology to ensure our sailors and marines are equipped with the capabilities that they require to perform the full range of military operations that they are required.

Our ability to maintain our maritime dominance has become increasingly difficult, however, as the complexity, risk, cost, and time to develop our weapons system has steadily increased with each new generation of technology. In fact, our technological advantage is eroding. It is being chipped away at, as other militaries leverage access to the rapid global advancements in commercial and military science, technology, and manufacturing.

The Department of Defense [DOD] has been on a campaign commonly referred to as Better Buying Power, which is focused on and making critical inroads to address these trends. As well, we appreciate the work of your committee to understand the issues and to enact the measures that will support us in meeting our collective objectives to improve upon the cost and time required to develop and deliver these leading-edge warfighting capabilities.

At the bottom line, maintaining our technological superiority requires greater innovation and agility to more than offset our adversaries' growing capabilities. Really, prototyping and experimentation are an essential element of our strategy. These efforts jump-start the development process and inform critical decisions on operational utility, technical feasibility, producibility, cost, and risk in order to expedite the ultimate fielding of advanced warfighting capability.

Now, what do innovation and agility look like today? In response to the proliferation of ballistic missile threat and turning to the proven capability of the Aegis weapon system, the President announced 6 years ago that we would install Aegis at a remote location in Romania to provide missile defense for our allies in the region.

In the ensuing years, involving sites at Huntsville, Alabama, and at the Aegis land base test site in Morristown, New Jersey, the Naval Warfare Center in Dahlgren, Virginia, and Wallops Island, Virginia, and the Pacific Missile Range facility in Hawaii, the Navy and the Missile Defense Agency completed the design, develop-

ment, and test of the most complex to date Aegis BMD [ballistic missile defense] baseline to perform the mission and separately designed the facility, and built, assembled, integrated, and tested the total system at Morristown; then disassembled, shipped, reassembled, integrated, and tested that facility on the ground in an austere location in Romania; all leading to turnover of the Aegis Ashore site to sailors of the 6th Fleet about a week ago.

In the interim, the Navy had provided ballistic missile defense by forward deploying four BMD-capable Aegis destroyers to the Mediterranean. Subsequent to their arrival, a new cruise missile threat emerged. In response, the Naval Research Lab, working with Naval Warfare Center at Crane, Indiana, went to work breaking down the characteristics of the threat and, within a deployment cycle, assembled, shipped overseas, and installed onboard the destroyers a transportable electronic warfare system that would effectively counter it.

In parallel, the Naval Sea Systems Command went to work designing and installing on the destroyers an adjunct system known as C-RAM that combines the radar, the Navy's close-in weapon system with the rolling airframe missile to provide defense in-depth against the threat. And all the while, the newest Aegis baseline and the Navy Surface Electronic Warfare Improvement Program are being updated with these capabilities to provide the permanent capability.

Meanwhile, in the 5th Fleet, a torpedo threat emerged that triggered a demand for a torpedo defense for our carriers deployed in that region. And what was called the "Push to the Bush," the Naval Undersea Warfare Center in New London, Connecticut, working with Penn State Applied Research Lab developed and integrated a series of underwater sensors, an alert system, and an antitorpedo torpedo that was installed on the USS *George H.W. Bush* prior to her deployment to provide the first-ever surface ship torpedo defense system. And we are now further improving upon that capability as we transition to a program of record.

Separately, in response to a combatant commander's demand, within a 12-month timeline, the Navy converted the retiring USS *Ponce* to perform the mission of an afloat forward staging base for the 5th Fleet. And *Ponce* proved to be the perfect opportunity to put to sea the first ever laser weapon system. The Navy is leveraging this experiment to further our development of directed-energy weapons.

And, meanwhile, on the other side of the globe, in the 7th Fleet, demonstration by China of a long-range antiship cruise missile, a long-range antiship ballistic missile, spurred rapid development of capabilities to counter these threats. And within about a year's timeframe, Naval Air Warfare Center at China Lake demonstrated the ability to employ the Tomahawk missile against maritime targets through a synthetic guidance, and we are exploring further systems with new seekers for that weapon.

Similarly, we are developing the antiship version of the air-launched missile known as JASSM-ER [Joint Air-to-Surface Stand-off Missile-Extended Range] and will explore further steps to develop a surface-launched version of this missile. And while the details regarding the defense against antiship ballistic missiles are

classified, we are employing the same basic skills of integrating mature technologies into proven systems to rapidly provide the capability necessary to defeat the threat.

Now, there are several key elements that are common to these examples of rapid prototyping and experimentation. First and foremost is a highly skilled and experienced acquisition workforce. And we are fortunate to have warfare centers, system centers, and laboratories equipped with world-class scientists and engineers uniquely qualified to develop technical solutions to complex warfighting problems, and they are positioned to leverage FFRDCs [Federally Funded Research and Development Centers], academia, small businesses, and the greater defense industry to execute our rapid prototype efforts.

The Department, with strong support from Congress, is taking measures to strengthen this workforce, and we look to further those efforts with you this year.

The second key enablers, the integration of these technical experts with our fleet forces, the collective wisdom of our operational forces combined with our technical community's understanding of complex science, technology, and engineering challenges facing naval warfare, provide an incredible opportunity to change the calculus of future naval warfare.

The third key enabler is designing our major weapons systems for rapid insertion of technology through the use of modular open systems standards. The success of the Navy submarine force's Acoustic Rapid COTS [Commercial Off-the-Shelf] Insertion program, which provided a common open system designed for submarine combat systems and enabled the near-continuous upgrade to the systems paced by available technology and a response to the threat, has spurred a sea change in naval systems design.

Navy and Marine Corps systems have since instituted modular open system design standards in the development of virtually all of our future platforms and major weapons systems.

The fourth key enabler is a work in process, and that is agility on the business side of the equation, primarily budgeting and contracting to match the agility we expect and demand on the technical and operational side. The cycle time of the budget process alone is arguably greater than the cycle time of the technologies we need to leverage and, in certain cases, the cycle time of the threat we need to defeat.

If we are to improve upon the speed at which we deliver capability to the fleet, we must improve upon the time required to go from the identification of a threat or a critical technology and touching the hardware and software required to defeat the threat.

I am confident we have the ability to collapse this timeline while yet maintaining the necessary judicious oversight required by Congress on the use of taxpayer dollars. We have demonstrated the ability to accelerate capability and response to urgent needs, and we are bringing a similar sense of urgency to major program acquisition to deliver capability at much-needed speed of technology.

The Navy looks forward to working closely with your committee again this year as we continue to tackle these challenges, and I look forward to your questions.

[The prepared statement of Secretary Stackley can be found in the Appendix on page 58.]

The CHAIRMAN. Thank you.
Mr. Lombardi.

STATEMENT OF RICHARD W. LOMBARDI, ACTING ASSISTANT SECRETARY OF THE AIR FORCE (ACQUISITION), U.S. AIR FORCE

Mr. LOMBARDI. Chairman Thornberry, Ranking Member Smith, members of the committee and staff, thank you for today's opportunity to discuss acquisition reform and particularly experimentation and agility. It is my pleasure to do so.

First, let me say that Dr. Bill LaPlante set our acquisition community on a brilliant course during his tenure, and I—

The CHAIRMAN. Mr. Lombardi, would you get that mike right in front of your mouth, please. Thank you.

Mr. LOMBARDI. Okay. Sorry about that.

First, let me say that Dr. Bill LaPlante set our acquisition community on a brilliant course during his tenure, and I look forward to build on that foundation. Through his focused efforts over the last few years, the data has shown that we have improved our acquisition performance. Our costs are trending down. We are meeting key performance parameters on our major programs greater than 90 percent. And we have garnered over \$6 billion in cost savings, using these savings to secure greater capabilities and additional weapons in the hands of our warfighters.

In this endeavor, we are supported by the leadership of Frank Kendall, the Under Secretary of Defense for Acquisition, Technology, and Logistics. Our Air Force efforts are aligned to his Better Buying Power 3.0 initiatives, as well Secretary James' Bending the Cost Curve efforts, all which are designed to strengthen our ability to innovate, achieve technical excellence, and field dominant military capabilities.

In today's complex environment, rapid change is truly the norm. We believe incorporating strategic agility into the Air Force's acquisition enterprise will be the way to capitalize on this dynamic environment. In order to make most of these potential opportunities, we are focusing the Air Force's efforts in three key areas: First, strategic planning, prototyping, and experimentation; second, science and technology; and, finally, modular and open systems architecture.

Over the past 2 years, the Air Force has made great strides to improve the strategic planning process as evidenced by the release of the visionary 30-year strategy. We are also reinvigorating the use of prototype and experimentation with the purpose of providing warfighters with the opportunity to explore novel operational concepts, incentivize innovation in industry and government, and reduce risk and lead times to develop and field advanced weapon systems.

Our Air Force S&T [Science and Technology] Program plays an integral role in technology development, often fielding temporary operational prototypes to meet urgent warfighter needs. However, they are not the final solution but a stepping-stone to further de-

velop a long-term solution that addresses aspects of producibility, reliability, and sustainability.

The Air Force also has more programs than ever implementing modular and open systems architecture approaches. Best practices to achieve this are, of course, the use of modular and open architecture designs, but also to include the use of standard interfaces and the use of block upgrade approaches to fielding. These methods should help shorten developmental timelines.

Such systems are designed to later upgrade, which can allow us to better manage our risk and schedule. We identified the advanced pilot trainer and the Joint STARS [Surveillance Target Attack Radar System] recap programs as strategic agility pilots that will utilize these approaches, much like the Long Range Strike Bomber is already doing.

To address the business-related challenges, we are prototyping a new acquisition approach called Open System Acquisition. It will enable aggressive competition toward rapid prototyping and utilize other transaction authority to create a consortium specifically focused on reaching nontraditional defense companies.

We tested this new process last year as a pilot initiative for the Air Force Distributed Common Ground System. Nineteen companies participated. We ultimately awarded it to two teams, both including nontraditional defense contractors who offer their products at approximately 80 percent of the original government cost estimate. Our efforts are now focused on formalizing this process and applying it to a broader sample of programs.

I firmly believe that the Air Force acquisition enterprise has and is building an even stronger engineering and program management culture that values the strategic agility as a core capability. We look to capitalize on the complex and dynamic environment of today and tomorrow to ensure our airmen have what they need to meet any challenge or any threat anywhere in the world.

In conclusion, I would like to take this opportunity to thank you for the authorities outlined in section 804 and 815 of the National Defense Authorization Act of 2016 as they support the direction that the Air Force and the Department are heading. And I thank you as well for your service to the United States and for your continued support to the military and civilian men and women who serve our great Nation.

Thank you, and looking forward to your questions.

[The prepared statement of Mr. Lombardi can be found in the Appendix on page 67.]

The CHAIRMAN. Thank you.

I think Mr. Smith—I tend to agree with Mr. Smith. Two key things are that we need to thin out the bureaucracy so decisions can be made faster; and, secondly, we have got to allow people to make mistakes. One way to help with that is to be able to experiment in prototypes so that you see if something is going to work before you buy a bunch of them. That is the purpose, I think, of what we are talking here.

So let me ask each of you if you could just outline very briefly the three top things that could be done to improve your service's ability to experiment and take advantage of prototypes.

General.

General WILLIAMSON. Yes, sir.

So I want to start with this discussion about flexibility, and I would like to finish with an observation on risk. So this notion of flexibility applies in a couple of areas within the program, starting with early research. One of the challenges that we have is in the making sure that you lock down the requirements for whatever system. And so when you look at prototyping—and I don't intend to make this a primer—but it is really important to understand what type of prototyping we are talking about.

So if I were [to] describe three, it would really be there is concept; there is developmental; and then there is operational prototyping. So in some cases, we have an idea for a program or for a capability that is needed, and these capabilities come in two areas. So, one, you want to address kind of a known threat, how can I quickly react to a known threat; and the second is, there is a technology opportunity for us to integrate into one of our systems.

And so as we look at those three types of prototyping, it is, how can we do that early enough in the process? How do we have the leverage and the flexibility to bring those into programs? And I want to highlight something that Mr. Smith said, and that is the risk piece.

The challenge that we have had in the past, sir, is that you want to have a direct tie to an investment that is made on the science and technology, on the prototyping and the experimentation, and you want to have a direct trace to a program of record, and you want to make sure that that technology is mature enough so that there is less risk in implementation.

But the reality is, is that in many cases, as I look at whether it is a subsystem or whether it is an end item, in some cases, it may be difficult to integrate; it may not be mature enough; and you may have to walk away from it.

And so the notion of risk, sir, becomes very important, because what I am finding—and I have watched this in our business for a while—is that unless that technology is mature enough to plug in, we are not willing to make the investment. And if it is not at the point where you have a great confidence, it is often hard to defend the funding associated, not only internally within the service but also at the Department and also to the American taxpayer—

The CHAIRMAN. Okay. So if I could summarize that, an improvement you think could be made is the ability to prototype early in technology development, even when it may not be connected to a program of record, or to experiment with technologies.

And then a different kind of experimentation in prototype is with more mature technology as you are approaching a larger acquisition. So there are kind of two kinds, and you need more ability to do the early, more experimental stuff without necessarily having it attached to a program of record.

General WILLIAMSON. Yes, sir, that is absolutely correct.

And just as an example, so for soldiers, for a dismounted soldier, the load that a soldier carries is really important. And so as we have more and more electronics on a soldier, one of the investments that we have to make is in batteries, in just purely power.

And so the investment that we make in efficient battery systems I may not be able to trace to every specific program that will use

it, but there will be a number of programs that will leverage the efficiencies that are discovered. I need the capability to be able to experiment in those areas and then, as I get more definition, be able to apply it directly to a program.

The CHAIRMAN. Okay. That makes sense to me.

Mr. Stackley.

Secretary STACKLEY. Yes, sir. Let me first state what I tried to touch on in my opening remarks. We are at prototyping and experimentation in a big way today. What we are doing though is fairly—I will call it—episodic. It is being driven by a compelling threat that gets top leadership's attention, and we make mountains move to address the threat. What we need to do is take that model and incorporate it into a way we do business every day. And so that is the journey that we are on today.

Much of what we need we are already working on. It is the skill set that I described, and I cannot overstate how critical section 219 funding has been to this effort. Section 219 funding is lifeblood to our warfare centers, our science and technical community, and so everything that you all have done to support that is paying off huge dividends, and it is underpinning our efforts in terms of prototyping and experimentation.

You touched on requirements and definition. The requirements and definition process is long and laborious, so if we are going to make serious inroads, we have to go ahead and march forward with prototyping and experimentation on the front end of the requirements definition process and not wait for requirements to be defined and then initiate an experiment.

The prototyping and experimentation help to inform and help to better define the requirements. We want the ability to take the risk in that phase before we have invested large dollars and committed ourselves to a particular system solution. We want to go ahead and take those risks, experiment with what is possible, better define the requirements, narrow the solution set, get a better understanding of what the cost will ultimately be before we launch into the program of record.

Prioritization is important. What we are doing today is we are taking our technical community, and merging it with our fleets, and sitting down with—inside of the fleet, they have warfare development centers—and sitting down with the warfare development centers and asking them, what are your top issues? We can't launch a thousand projects today. What we want to do is ensure that, at least on the front end, our efforts are focused on the top priorities. So we are getting those priorities from the fleet to address the—before requirements definition process—the experimentation that will help us all out and then move into execution.

So let me talk about the things that we need to help out. One is money, and I am not coming here asking for money, but what I am describing is that the budget process, if we have an emerging issue today, we have missed the train for PB [President's budget] 2017. In fact, we have already submitted the POM [program objective memorandum] issue sheets for PB 2018. So an emerging issue today may or may not make the 2018 budget request.

So we are sitting here in early 2016 without dollars that are available to address an emerging issue or a critical technology that

creates an opportunity unless we have something like the entire Department aligned to reprogram and to do the acts that go outside of the normal budget cycle.

So what we are grappling with is, how do we make dollars available to either address emerging threats or to respond to available technologies that will give us the capabilities that we need?

The second issue is simply intel [intelligence]. The better we are aligned with our intel community, the less technical and operational surprise there is and better informs us in terms of our efforts earlier on. So, quite often, we are responding to the threat. The earlier start we get on that through access and alignment between our technical community, the intel community, and the operators, the better start that we will get.

And the third item I would mention is access to commercial technology. And you see and hear of initiatives that are going on today, DIUx [Defense Innovation Unit-Experimental] that the Secretary of Defense has announced.

But the bottom line is, there is much more technology available to help us solve our issues than we have direct access to today, and this in part is due to a reluctance in certain sectors of technology to plug into the large government, the large Department of Defense, because of fear of the bureaucracy that you referred to and what that might mean in terms of things like data rights, things like layers of oversight, what is referred to as the burden associated with doing business with the government. We are going at that. We are trying to pierce that. But that is not going to be a quick turnaround.

The CHAIRMAN. Okay. Thank you.

Mr. Lombardi.

Mr. LOMBARDI. Yes, sir. Let me piggyback on both General Williamson's and Secretary Stackley's comments.

From the Air Force perspective, what we are looking at is it is all about a team support and it is all about a team support getting together earlier. There was the discussion about the requirements. And what we need to do is make sure—and as we are doing in our developmental planning type of activities, is bringing the operator and the requirements generator and the technologist and the acquisition community together early on so that we can take a look at where the S&T investments are right now, where the gaps actually are, where are the needs that the customer actually has, and start early on looking across the whole spectrum because it may not necessarily be a material solution. There may be that technology there that could rapidly go out into the field, but we need to understand how that technology would be operated. And then we need to take a look and make sure that we are developing the requirements set properly.

If you don't do the early prototyping and experimentation early on, what tends to happen is we tend to recreate the requirements set that was from the previous system that this is replacing. And that is the wrong answer. What we need to be doing is really looking forward to, what is this new technology going to enable us to do, and how can we employ it in a better fashion?

And so that is a key area where we have to be able to get the teams together early on. And we are working that within the Air

Force in our enterprise collaboration teams and by virtue of bringing people together on very specific areas at first, and then we will take a look across the board.

But we are looking at, for example, our Air Superiority 2030 activities, which will allow us then to look at what might be the technology that is required later on and then how do we develop the CONOPS [concept of operations] associated with executing that, and then that rolls into the actual developing of the requirements that we can go and build to.

Piggybacking on Secretary Stackley's comments on funding, the funding needs to be much more flexible. As was stated, we are already building our 2018 budget before the 2017 is even hitting the street here.

And in there, if we are really going to be able to look at that, our budget documentation, because this is in the R-docs [requirements documentation], we tend to have to write to very specific areas. And as a result of that, we don't know 2 years out what specific areas that we are really going to want to attack. And as a result of that, then we end up having to come back in for reprogrammings or getting approval for new starts. And so if there is more flexibility in the language in the documentation that will allow us to start activities with less specific details, that would be very helpful for us. And then, again, as bringing in the use of nontraditional players, we have had some very—some good experiences with that.

I mentioned in my opening statement the Air Force DCGS [Distributed Common Ground System]. You know, what we have done is been able to do—by virtue of having open systems of architecture—be able to bring in nontraditional players that we typically don't see in our trade space. And so that is an important area for us to reach out to that community, and our DCGS office is actually reaching out to DIUX to understand where there are people who could actually—companies who could actually support them in developing new capabilities, agile capabilities to bring new capability to the DCGS.

Thank you.

The CHAIRMAN. Thank you.

I just mentioned on the flexible funding, I think, for me, I am interested in working with you all to figure out ways to do it, especially going back to early prototyping. We have to make sure there is the oversight mechanisms for the use of those funds because that is obviously our responsibility. But surely to goodness, we can find a way to meet your need and also our responsibilities at the same time.

Mr. Smith.

Mr. SMITH. Thank you.

I want to talk just a little bit about the program of record, which has come up a little bit here. And I view, based on a lot of historical examples, the program of record as being essentially evil. I realize there is a necessity for it.

But I just want to do a little thought experiment and see if there is some way that we can reduce that, and I will use just one example: the expeditionary fighting vehicle [EFV]. We all know that the original idea didn't work out. I won't get into that. That has a lot to do, I think, with what the chairman says about prototyping and

understanding what you can and can't do before you spend \$8 billion.

But once that was done, the Marine Corps still had to get a new amphibious assault vehicle, and there already exists—I think it is four different companies that make four different types of amphibious assault vehicles. And the Marine Corps was able to go out and look at them and say: Yeah, I think these will meet our needs.

Now, the world that I would like to live in is a world where they go: That is the one we want, or we want these two; give us 10,000 of that and 10,000 of that. Now, the world we actually live in is even though these things already existed, even though the Marine Corps looked at them to make the decision, they had to go back and write an RFP [request for proposal] out to these four companies. And they are down-selecting and moving through it. And I am sure somewhere along the way, someone is going to say: That is great, yeah, but can you make it lighter, or can you make it heavier, or could you put a gun here?

And by the time we are done with it, this thing is going to wind up costing a heck of a lot more than if the Marine Corps could have simply said, like I said: Give us 10,000 of those. That is great. Let's go.

So what is wrong with my scenario that I just described? Why can't we do that? And getting out of that scenario, is there any way we can reduce the number of purchases that are made by the Pentagon that require a program of record and simply allow for more buying, if you will? This isn't really commercial-off-the-shelf because we are talking about a piece of defense equipment. You can't go out and buy your own amphibious assault vehicle.

But it is, nonetheless, you know, commercial-off-the-shelf, or if there is an existing piece of technology and you want to buy it, is there a way to reduce our reliance on having a program of record and all of the costs that come with that? Is there something we could do legislatively to help make that possible?

Secretary STACKLEY. Sir, let me take that question. I have a lot of history on this particular program. You correctly summarized the expeditionary fighting vehicle in terms of that vehicle prototype was in the late 1980s, and the program was canceled in 2009. It was difficult. There is a difficult history that went behind that.

The shift to what is referred to as the amphibious combat vehicle, which is the competition that is currently ongoing—and, in fact, we have an award that was done a few weeks ago—

Mr. SMITH. Yeah.

Secretary STACKLEY [continuing]. There were, in fact, four competitors, and we have gone to a down-select.

Now, let me offer—you made a reference to cost. It would be cheaper to just go off the shelf than to go ahead and solicit proposals. I would refute that. Now, what we are doing is we are leveraging competition to drive cost down for the vehicle that the Marine Corps requires. And, in fact, the cost that we have received in the proposals are extremely affordable relative to—much more so than what was the EFV and relative to estimated cost based on the four contractors outside of competition.

Mr. SMITH. We don't have it yet, so I wouldn't celebrate that it-costs-less thing until we actually have the piece of equipment, is the one thing I would say, but—

Secretary STACKLEY. Yes, sir. Now up a couple things to go with that. One, the structure of the contract, okay, our confidence, it is effectively getting us into a fixed-price arena because we are leveraging extremely mature technologies, as you described.

Mr. SMITH. Right.

Secretary STACKLEY. We are leveraging mature technologies not just to have high-cost confidence but inside of the contract to give us what effectively is going to perform like a fixed-price type contract.

Second piece is, we are going after this capability in an incremental fashion, which reduces risks, and we are going after it in two separate increments. The first increment will give us capability that we will be able to put to work early on, but ultimately we want Increment 2.

What we have been able to do through the competition in identifying what Increment 2 capabilities will be is we have been able to drive the competitive field to offer vehicles that come as close as possible to an Increment 2. And, in fact, the potential is there that this initial vehicle that we award will be able to take us from Increment 1 to Increment 2 without any further follow-on development effort.

So the entire approach here was to leverage mature technologies, take the industrial base that is out there today producing combat vehicles, lay in the requirements that are unique to the Marine Corps, do it in such a fashion that it is incremental but make it clear where we ultimately need to go and to let competition drive cost down and drive the competitive field to deliver those capabilities as early as possible.

We think we are exactly where we should be. And the only thing we regret is that the first go-around, going back to EFV, didn't take a similar type of approach.

Mr. SMITH. That is a good explanation. I remain skeptical, and we will talk in 3 or 4 years when we see how all of what you just described plays out. But I still think, you know, shifting toward—and obviously this is a rather significant piece of equipment that I referenced. There are smaller things, and one of the things I would like to emphasize is buying more commercial-off-the-shelf. If there is a product out there that will do the job, let's just buy it and do the job because you can have competition in that environment too. I mean, even in this case, if there are four vehicles out there, there is competition right up front. I don't see why you have to have an RFP and a program of record to get those companies to compete. But I take your broader points, and we will see how it plays out.

Secretary STACKLEY. Sure.

Mr. SMITH. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Mr. Forbes.

Mr. FORBES. Thank you, Mr. Chairman.

And we need to first acknowledge the effort that you and the ranking member have put in this whole area of acquisition reform. Thank you for that.

Gentlemen, thank you for being here. All three of you are incredibly qualified, talented individuals, and we just appreciate your service to the country and being here.

Let me tell you one of my most frustrating points when we are talking about acquisition reform, especially when you look at emerging technologies, capabilities, and threats. People come in here, and they give us the scenario. They say: In a best world, we have a year at the Pentagon to prepare a budget. Then it takes a year over here in Congress. And then we start trying to utilize that funding, and some of the stuff we are looking at has a shelf life of 3 years.

But when I watch speeches outside of this committee room and try to listen to the changes they want, here is what I normally hear: A restating of the problem; secondly, I hear people say something needs to be done; then they say we are studying it; then they say we need a stable budget; then they will give some examples. But, oftentimes, we don't get the specificity we need.

Mr. Stackley, you have had incredibly good work. You have been there 7-plus years, I guess, now. Based on your personal opinion and from the study you have had and what you have done, does the Navy need to establish something similar to the Air Force's Rapid Capabilities Office?

Secretary STACKLEY. Let me describe it this way, sir: The Navy is going about that. And the way I would describe it, the Air Force's Rapid Capabilities Office [RCO] emerged about a little bit more than a decade ago and specifically focused on ISR [intelligence, surveillance, and reconnaissance] missions and special aircraft. And so it has a unique focus.

We are looking much more broadly than that, although there will be something that will closely mirror the Air Force RCO going forward for unique missions, particularly in the black world.

But much more broadly, we do have a very strong technical base that we need to better leverage, and we need to marry it up more tightly with the fleet and the Marine Corps to short-circuit that longer process that goes through the requirements definition, the budgeting process, to ultimately get into a program of record.

Mr. FORBES. So it would be your opinion that we need something that may not look exactly like the Air Force's Rapid Capabilities Office, but we need something similar to that in the Navy?

Secretary STACKLEY. Yes, sir. And we actually do that today. However, we do it almost in an ad hoc fashion. And so what we are doing, and that is my organization alongside CNO [Chief of Naval Operations] and the Commandant, what we are doing is we are aligning our teams, and it is going to be one team, to bring the best technology and technical experts that we have to bear against the highest priority requirements that are being defined by the fleet today.

And then let's launch now into experimentation and prototyping on how to deal with either that threat or that critical technology while in parallel the machinery starts up for requirements definition and budgeting so that by the time we get into that cycle, we

have a firm understanding of the technical, and we have a much greater understanding of the cost, and we have started to shape and point our industrial base towards the solution. So we will both make progress in the interim and then reduce the amount of time it takes on the back end to ultimately field the longer term solution.

Mr. FORBES. So it would be fair for the committee to expect that we would perhaps be seeing something in a more formalized structure like that Rapid Capabilities Office in the coming months?

Secretary STACKLEY. Yes, sir. I think you can expect that Secretary, CNO, and Commandant will do a more formal rollout of this construct.

Mr. FORBES. You also mentioned in your prepared testimony that one key enabler of innovation is funding expressly for rapid prototyping, experimentation, and demonstration. Will we be seeing any of that in the 2017 budget, and if so, where shall we be looking for that?

Secretary STACKLEY. It would be preemptive of me to be discussing what is in the 2017 budget. However, most of these efforts are in an account called 6.4. It is in the R&D [research and development] account 6.4. Right now, our 6.1 through 6.3 funding, which is sponsored by the Office of Naval Research, is a very mature budget process, and I think you all are very well familiar with it.

When you get beyond 6.3 and get into 6.4 and beyond, now you are into programs of record, what we want to do is carve out the ability to increase our prototyping experimentation inside of that 6.4 account, and we will discuss it in greater detail when the budget comes across.

Mr. FORBES. Thank you, all.

Thank you, Mr. Chairman.

The CHAIRMAN. Mrs. Davis.

Mrs. DAVIS. Thank you, Mr. Chairman.

And, really, just following up with everything that has been said previously, can you pinpoint to some extent—and I want to applaud you because you have the answer basically. I mean, you know what needs to be done. What is really getting in the way of doing that?

How much responsibility does Congress bear? What can we obviously do better? And you have cited the 6.4 accounts. I don't know whether in terms of other research and development, you know, be it DARPA [Defense Advanced Research Projects Agency], people are aware of what is done there. What else—where else can you drive this?

Secretary STACKLEY. Yes, ma'am. If doing that is associated with the discussion we just had on funding, the issue is budget exhibits require that we define exactly how we are going to use the taxpayer dollars so that you all can authorize and appropriate and conduct the oversight.

The nature of the beast, whether it is emerging threats or available critical technologies have become available, is that it is hard today as we put together our POM 2018 issue sheets. We cannot predict what that threat will be in 2018 so that when we are in execution we have dollars available to go directly to the threat.

And so we are looking for, as General Williamson described, a degree of flexibility. And we are not talking large dollars, frankly, because we are talking prime-the-pump levels of funding that let us get the technical machinery moving aside the fleet to address these early experimentation efforts as soon as we see a technology or a threat that we want to address. Not large dollars, but defining it so that you all have confidence in terms of being able to authorize and appropriate to those dollars has been a challenge in the past.

Mrs. DAVIS. General, did you want to speak to that?

General WILLIAMSON. Ma'am, I just want to talk a little bit about the flexibility, and I am going to use an example, of which hopefully it is not overly simplistic, but I just want to give you this example.

So this is not kinetic. So this is not about buying a new gun. But as I am progressing with a combat vehicle or even a tactical truck, and if I discover through some of the applied research or industry comes up with a better transmission, I am on the path where I am building a system. But a year into that, someone says: There is a great capability out there, a new transmission that will reduce fuel requirements by 50 percent. Because of the way we earmark—that is the wrong word for you. I apologize.

Mrs. DAVIS. Don't want to use that word here.

General WILLIAMSON. I apologize. But the way we identify how funding is going to be used, it will be a year before I can flex within my budget for that program to start doing integration work with that new engine.

Mrs. DAVIS. Yeah.

General WILLIAMSON. And so if I have some leverage, if I have some flexibility, say, great technology, because of things like modular systems architecture, I can start doing the work to plug that in now. I don't have to wait.

Mrs. DAVIS. I would hope that everybody sees that as very commonsensical, to be able to shift when you see a need and be flexible. And I think what would be helpful—and I think you are already working with that, Mr. Secretary—is how then you define that perhaps in a budget process so that you have that ability to do that.

And I guess what I am looking for is, where are still the obstacles to doing that? You know, we have been in the situation now for quite a number of years, and I think, just as Mr. Forbes mentioned, we kind of keep hearing the same thing. You know, we have got a problem. We need to fix it. We need to redefine it. We need flexibility. And how can we unstuck this a little bit more so that you have what you need or without even waiting until the next NDAA?

Secretary STACKLEY. Yes, ma'am. Well, let me commit to you that when the budget comes over, we are going to be coming over with the budget and sitting down with the authorization and the appropriation committees to lay out an approach and a process that will give you all the confidence and the insight and the oversight in terms of how we would execute funding to increase the degree of experimentation and prototyping that we are describing here today.

Mrs. DAVIS. And you don't feel you can do that with existing legislative authority?

Secretary STACKLEY. Well, actually, I think we can. What we need to do is convince the Congress that it has the degree of oversight and insight that it needs to do its job.

Mrs. DAVIS. Okay. Thank you, sir.

The CHAIRMAN. Chairman Davis—Chairman Miller, sorry. I was thinking about Mrs. Davis' comments. Chairman Miller.

Mr. MILLER. Thank you very much.

I am wondering why you feel like the need for flexibility—and I understand for rapid acquisitions. In fact, Mr. Lombardi, you talked about flexible funding, and then, Mr. Stackley and General Williamson, you both have referred to it. There probably was a reason at some point that Congress kind of stovepiped the money in the way it comes to you. Any idea what that reason was?

Secretary STACKLEY. Sir, I can just give you one example, and this goes back probably 20 to 25 years ago. We had a thing called the M account. And the M account was a management account to—it had a degree of flexibility in it as a management reserve effectively for the Department.

And Congress determined that it effectively did not appreciate the way the Department was managing the M account. And separately, as pressing needs emerged, the choices were between having dollars parked into an M account or having those dollars go toward specific budget line items. And so the M account eventually went away. That was a large account in terms of providing management reserve.

Since then, there has been a reluctance to put any dollars into the budget that don't meet very well-defined, disciplined definitions of how the dollars will be used. And I think we can get past that. I think we can get past that. And I am looking forward to when the budget comes over, sitting down and talking with the committees and your staffs to work through this.

Mr. LOMBARDI. I would like to just add on this. And I think, dating back to about 20 years ago, I think there was a concern with respect to coming out of accounts like this where we were actually starting program of records.

And so I think, as Secretary Stackley says, I think it is very easy for us to come back together with a plan that would allow for all of us to have the flexibility that we need and the proper oversight for both the appropriation and the authorization committees to make sure that we are executing the funds in a logical and a very meaningful manner.

But I think that a lot of what has been happening in the past was based upon a fear of us actually launching off on program of record based upon doing a certain type of prototyping early on.

General WILLIAMSON. Sir, just to comment, I completely support the comments made by the other services. I do want to go back to something that was said earlier though, and that has to go to the culture in terms of risk tolerance and the culture of risk.

So we all sit around and talk about the various successes that come out of Silicon Valley, but what we don't often do is talk about the number of failures that occur. And so one of the things that has to happen is we have to not only come with the plan that has been

described and the appropriate due diligence to support that plan, but we also have to be willing to, if we want to push the envelope, if we want to have a capability that is not the current state of the art that our adversaries have or have access to, but if we are willing to push the envelope, there has to be some acknowledgment that there is risk associated with some of these experiments.

And that culture, not just here, sir, but within our own service, within the Department, it has to be something that we are able to kind of quantify that risk but also appreciate that if you are going to push the envelope, there will be times where it doesn't come to fruition.

Mr. MILLER. I think most of us recognize that there is a need to take the risk, and I think we are willing to do that. I think the issue is between risk and waste, and that is where the biggest problem, I think—but is it that difficult to go through the re-programming process here in Congress, or is it difficult at DOD to go through the reprogramming?

Secretary STACKLEY. I would say it is difficult, both sides. It is difficult inside the Department of Defense because it starts with you identify a need, then you have to identify an offset. We don't send over reprogramming requests on the Aegis typically, and so it is a fairly long cycle within a cycle and it is a tough process.

And then when it comes over here, it gets the appropriate scrutiny. So it is an element of time, sir. And relative to the annual budgeting process, which, as we have described is about 2 years from the identification of a need when you actually get funding, it is probably half of that. But it is also funding that you cannot rely upon in terms of building a plan around to go ahead and get started executing. And so it is a degree of uncertainty that comes with the process.

The CHAIRMAN. Mr. Courtney.

Mr. COURTNEY. Thank you, Mr. Chairman.

And thank you to the witnesses for the hearing today.

In the last defense authorization bill, we actually moved forward on a series of reforms. And, again, I salute the chairman and ranking member for their hard work in terms of some of these streamlinings of the acquisition process.

Another thing to build in was to revisit the National Sea-Based Deterrence Fund to expand the range of acquisition tools available to the Navy as they prepare to move to the next critical stage of recapitalization of our ballistic submarine fleet, which, again, has been consistently identified as one of the top priorities of our national defense. It is also one of the highest cost programs that we are facing.

In the 2016 NDAA, we expanded the fund to include authorization of incremental funding authority, economic order quantity contract authority, and advance construction authority. And, as Mr. Forbes knows, last month, the Seapower Subcommittee held a hearing on acquisition efficiency in Navy shipbuilding, and CBO [Congressional Budget Office] and CRS [Congressional Research Service] testified. Among their findings, both experts testified that using the fund with these new authorities would generate up to a 10 percent reduction in program costs. So we are talking about \$100 billion program; 10 percent is real money. That is almost the

equivalent of getting 12 boats for the price of 11, according to their math.

So, Mr. Stackley, I just wanted to ask you if you have considered the benefits outlined by CBO and CRS in the use of the fund as it exists today with the new authorities that were enacted in the NDAA 2016 bill.

Secretary STACKLEY. Absolutely, sir. First, the Department of the Navy greatly appreciates the way this committee has worked with us in terms of identifying the challenges associated with the *Ohio* Replacement Program [ORP] and helping to put tools in the toolbox to address those challenges. As we have discussed in the recent past, the Navy is working closely with industry, both Electric Boat and Newport News, in structuring an approach to attack the affordability side of the equation.

The authorities that you have put in place, they will be extremely helpful. What we need to do is come back with a comprehensive approach, a more comprehensive approach, that explains to Congress how we are going to use these authorities, what the benefit we all receive from that, and how this is going to ultimately drive down the costs to recapitalize that critical asset. This will be an important part of our dialogue in the 2017 budget cycle.

Mr. COURTNEY. So in terms of the ORP acquisition strategy and budget outlook, the authorities that we enacted last year—or in the 2016 bill—they are something that your office is definitely looking at in terms of that plan that you are talking about working with us on?

Secretary STACKLEY. Absolutely. The nature of the beast is we are still in the design and development phase, and the authorities that we are talking about really apply to the procurement phase, and so we have lead time in terms of structuring. So, for example, when we talk about EOQ [economic order quantity], we are all in in terms of EOQ. It is going to be a 12-boat procurement. There are certain things, like missile tubes, that we are going to stand up an industrial base that is going to make 12 boats worth of missile tubes, and then it is going to stand down. So if we stretch that out over a 15-year period, the only thing we know for sure is that will be the most costly way to procure missile tubes. So we want to look at how do we leverage EOQ type of authorities and then batch build the missile tubes in such a fashion that we will be buying them potentially ahead of need, but we will be buying them in the most affordable manner and with the least impact on the industrial base.

Mr. COURTNEY. Good. So, again, because that was one of the components that we wrote into the law last year, that is encouraging to hear that the Pentagon is embracing this. And the only observation I would make is that the fund has been sort of critiqued in some quarters as sort of a gadget that doesn't by itself generate savings, that the authorities are really where the money is. But what I would just note is that what we were able to do in this committee was to sort of package those authorities under the umbrella of the fund, which I think really made the legislative process, which has also got its own sort of cumbersome challenges, move smoother. So I think unpacking them and trying to do it sort of in a one-by-one process in terms of these authorities is going to

potentially undermine our ability to keep this moving forward, again, in the most intelligent, cost-effective manner possible. So, again, thank you for your comments this morning, and we look forward in the next coming months to making sure that we give you those tools in the tool box, to make sure that this program, which is going to be a huge fiscal challenge, gets done in the most efficient and cost-effective way possible.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Mr. Wilson.

Mr. WILSON. I want to thank Chairman Mac Thornberry for his promotion of acquisition reform, experimentation and agility. I believe he is really making a difference and with your help.

In particular, Secretary Stackley, what lessons can you draw from the experience of building a prototype laser weapon system on the ship *Ponce* that might illustrate the value of prototyping as well as the limitations?

Secretary STACKLEY. Yes, sir. Thanks for the question. The laser weapon system on board the *Ponce*, size-wise it is what we would refer to as a 30-kilowatt [kW] system, so it is probably at the lower limit of lethality. But what we are able to do by experimenting with IT is to understand, how does the laser perform in a maritime environment, which has always been a risk with this type of technology? We are learning, what do we need to do to scale up from 30 kilowatts up to notionally 150 kW, which is a more lethal size weapon system? What does that mean in terms of shipboard, space, weight, power, and cooling requirements? What is the performance of the system against moving targets, both fast-moving surface targets, as well as aerial targets? And then what is the ship system and, most importantly, the operator perspective in terms of utilizing this and coupling it with other self-defense capabilities on a ship?

Our next step is today we are taking the lessons learned from the *Ponce*, and we are evaluating and exploring a 150-kilowatt system to go onboard a DDG-51 class [guided missile destroyer] for experimentation and prototyping to determine, is that the right size, shape for a system that will provide the degree of lethality that we are looking for out of this directed-energy system?

Mr. WILSON. And speaking of systems, the success of a nuclear Navy, with submarines, with aircraft carriers, other ships, with the reactors that are located, what research is being done to promote small modular reactors [SMRs] that can be used at military facilities around the world to make them independent of electrical grids?

Secretary STACKLEY. Sir, I know there are studies that have been done on this. I would have to get back to you with a more thorough response to give you the results of those studies.

[The information referred to can be found in the Appendix on page 85.]

Mr. WILSON. The success, again, of the Navy for decades should be replicated with SMRs, and I wish you well.

For each of you, General, thank you.

Mr. Lombardi, thank you for being here.

What challenges or limitations do you see from the acquisition community in pulling good technologies developed by science and

technology, S&T, investments into the acquisitions programs of record?

General WILLIAMSON. Sir, I would say that is consistent with some of the discussion that we have had today in that how do I, one, have more awareness of those programs? So the work that is being done out in Silicon Valley in terms of exposing some innovative companies to our requirements I think is a great start. The problem for us is, because I am not completely sure, how do I create head room within programs so that I can bring those in as I discover them and plan for them? I think that is the biggest challenge for us right now, is identification and then the ability to have enough agility to fund them as we discover them into a program.

Mr. WILSON. I am glad you mentioned Silicon Valley. I am very grateful for the efforts of Secretary Carter working with Silicon Valley to address the challenges of cyber warfare and conflict.

Secretary.

Mr. LOMBARDI. Yes, sir. I think, as we have talked before, is the importance of being able to bring together the technologists and the operator early on to really kind of understand where the real investments need to be in S&T to take care of near-term needs, but also look at where the long-term gaps are and where we need to be investing our S&T dollars. So I think by virtue of us being able to start more collaboratively bringing in the operator and the S&T with the acquisition community, we can start being able to bridge that gap.

But there is still, as we tend to call it, the “valley of death” going from S&T to a program of record. And by virtue of bringing the teams earlier together—because, as I said earlier, development and planning to us is a team sport, and you have got to be able to work together to determine whether the emerging technology can actually take care of the given need; are there CONOPS that can be done, or do we actually need to do increased investment? And that in turn helps them on the development of their requirements for us to be able to turn that technology and bring it forward into the program of record.

Mr. WILSON. Thank you.

The CHAIRMAN. Ms. Tsongas.

Ms. TSONGAS. Thank you, Mr. Chairman, and thank you to all of our witnesses today. And in particular, I would like to welcome you, Mr. Lombardi. As we know, I came to know you in your work at Hanscom Air Force Base, and it is great to see you here in this new capacity. I appreciated very much the work we were able to do then, and I know coming from the Massachusetts environment, you do recognize the opportunities presented by working with the academic communities as well as the private sector and the federally funded research facilities and the opportunities that that creates given the rapid-change environment we live in.

I wanted to revisit some of your testimony and what you talked about the Air Force’s efforts to contract with companies that have not traditionally worked with the services. I know this was a pilot project that actually took place at Hanscom. I am just curious as to what your experience was with this type of outreach, and what are some of the best practices and lessons learned that came as a result? Given the universe of companies that are out there, I am

also curious as to how you identified and solicited those companies to become part of this effort.

Mr. LOMBARDI. Yes, ma'am. As I mentioned—and you are correct that this was all done as part of the team up at Hanscom, the PEO [program executive officer] up there, Steve Wert, as you are well aware. The DCGS program, what really helped us in being able to reach out to nontraditional companies was actually the fact that we had gone in and opened up the architecture with respect to the DCGS system. And by virtue of doing that, that opens up the capabilities of really going out to the nontraditional players because oftentimes, the nontraditional players are the ones who are going to provide you near-term really relevant applications or smaller components or anything. And so in the case of the DCGS, what was really interesting on this was that we were able to take a process that was actually—our DCGS is actually a system that takes in the intelligence and disseminates it out. It is disseminated out to not only our U.S. forces, but also coalition forces, and so the security levels are different. So what was happening was is this was a manual thing that was done over a half hour to an hour to be able to essentially take out elements of the reports to make sure it met each of the different players, different partners, and so by virtue of doing this application, we were able to get that work done in a matter of 30 seconds.

Ms. TSONGAS. But how did you identify the people you brought into this effort? How did you reach out to them?

Mr. LOMBARDI. By virtue of going out and doing this as “other transaction authority,” we were able to reach out to and build a consortium, and of that, the consortiums were all playing together, and the consortium was built with traditional and nontraditional players. And by virtue of that, then they started teaming together, knowing where the real capability of each were, and it came together into—as I said, there were originally 19 different companies, but they then went into about 13 teams. And, ultimately, we have got us down to awarding of two. So it was really the use of the other transaction authority that allowed us to reach out to consortiums that were building upon themselves in this matter.

Ms. TSONGAS. And this was an experiment, so you weren’t really wrestling with the companies’ concerns that Mr. Stackley referenced about nontraditional defense companies that don’t know how to wrestle with the data rights issues or are concerned about them or the oversight issues. It was really more an experiment that sort of put those things aside?

Mr. LOMBARDI. It was an experiment from that standpoint, but I think there is an opportunity here and particularly as we look at more and more of our systems having this open architecture approach, where we will be able to reach out and get to people who are really more of the nontraditional players because, in that case, we are going to actually own the standards. We are going to own the interfaces. We are going to own how everything is integrated in together. So by virtue of doing that, we can reach out to a better population of players to be able to support us.

Ms. TSONGAS. And you are taking this into account as you formalize this process and broaden it?

Mr. LOMBARDI. Yes, ma'am.

Ms. TSONGAS. Thank you.
I yield back.

The CHAIRMAN. Mr. Turner.

Mr. TURNER. Thank you, Mr. Chairman.

Mr. Lombardi, now the focus of this hearing is on experimentation, agility, and ultimately delivering combat capability to our men and women in the field. With that in mind and for over six decades, the Air Force's Big Safari program has been an extraordinarily successful, agile organization, and it has in the past been a go-to organization when capability was needed in a short amount of time.

Yet it appears over the last few years that that sort of agility has come under some stress, and Big Safari is operating more like the mainstream organizations rather than trying to leverage and replicate that agility into those organizations. As one example, we understand that the contracting function has been moved out from under their organization, just as it has been across the rest of the Air Force. It would seem to many that aligning all elements of program execution under a single entity would make more sense.

Looking back on what made this program successful, isn't the Big Safari program a model for some of the acquisition reform that we clearly need and are looking for now, and is this an acquisition culture model that we need to fully protect and to foster?

Mr. Lombardi.

Mr. LOMBARDI. Yes, sir. Big Safari has and continues to provide great capability for our Air Force and our warfighters. And you are right; the model has been one that has been very agile to be able to provide capability out to the warfighters in a very rapid pace. It is a model that we should continue to foster. I will have to get back with you, sir, with respect to the taking of the contracting element out of the Big Safari area, if you don't mind, because I would like to be able to study that a little bit further and understand what were the reasons associated with that.

Mr. TURNER. I would appreciate that because, obviously, if you look at its success, we don't want to diminish that success as we might look to it as a model.

Mr. LOMBARDI. Yes, sir. Let me look to that, and I will get back to you.

[The information referred to can be found in the Appendix on page 85.]

Mr. TURNER. Thank you.

The CHAIRMAN. Mr. O'Rourke.

Mr. O'ROURKE. Thank you, Mr. Chairman, and I also want to join my colleagues in thanking you for your leadership on this issue. It is a very difficult one and one on which the Congress has worked for a long time, and I hope that with your leadership and that of the ranking member, we will continue to make some progress this year. There were a number of obstacles listed by both the chairman and the ranking member as to why acquisition reform has proven so difficult.

One that was omitted, I believe, was the influence of the defense contractors themselves. We know that in 2014, which is the last year for which we have full data, they spent \$70 million to influence the decisions that lawmakers make, and I think that is a fac-

tor. I don't know how large a factor. We can measure what they spent. I don't know what its effect is on the ultimate decisions, but it is a factor, and I think that needs to be included in the calculus for reform. And I would link campaign finance reform to military acquisition reform. I think those two things are important, and I would welcome any comments on that.

However, I would like to ask a question about a different area, and it gets back to another issue that has been raised in today's hearing so far, and that is allowing the military the freedom to experiment and the freedom to fail in order to better guarantee innovation and success down the road long term.

General Williamson, I would like you to talk a little about the Network Integration Evaluation, or NIE, and the Army Warfighting Assessment, or the AWA—one which looks at programs that are programs of record and the other that allows the Army to experiment with programs that are not programs of record—and how those two work together to satisfy the concern that many of us have raised and you have pointed to. I think I heard you say that we are looking for early, more experimental stuff, not necessarily connected to programs of record, not necessarily connected to identified gaps, but those kind of things that may appear in the future unbeknownst to us now.

General WILLIAMSON. Sir, thank you for the question. This is one that I think as an Army we are very, very proud of in terms of the development of both the network integration exercises and the new warfighting assessments. So what we discovered in 2011 is that, as we were deploying capability in the theater, we found that even though we were finding the best of breed, whether it was a radio or a system, the integration was happening in the field in combat, and what we really needed was a venue to make sure that all of the pieces worked together. So the start of the NIE really was focused on integration. But at the same time we were doing that, sir, we really discovered that we did not have a good operational venue to look at new capabilities, get the warfighter to touch them early on and influence the requirements process and to make changes, refinements, in the requirements.

So the network integration exercises quickly evolved from pure integration to also looking at, what is the effect of introducing this new technology? Because here is what I would offer to you, is that in some cases, it is not a new thing; it could be a new use for an existing technology. And how you do tactics, techniques, and procedures, how you organize your unit, all of those things have an effect on, am I increasing warfighting or the power of that unit?

So as we discovered that, the NIEs really were technically focused, and we discovered that we needed to also spend more time reaching out and looking deeper, further out. What capability do we need 5 years, 10 years, 20 years from now, and the warfighting assessments that we are now implementing give us that capability.

And, sir, to your point, this is really what is so important about what we are doing, is that that information comes back, and it influences not only current systems, but it also sets the conditions for the requirements documents that are more realistic in terms of what is really needed. I think this is something that did not exist. We did small pockets, but the center of gravity for us is a brigade.

And even though this is resource heavy, we dedicated an entire brigade to have these experiments and to do these integration exercises. We are very proud of what they have accomplished.

Mr. O'ROURKE. Thank you.

I yield back.

The CHAIRMAN. Chairman Kline.

Mr. KLINE. Thank you, Mr. Chairman.

Thank you, gentlemen, for being here. I heard a couple of you, I think Secretary Stackley and Lombardi, saying that they were confident that we could reduce some acquisition time, and you were on the right track for making changes. And that is good, but I am probably pretty skeptical. I certainly hope we can reduce the time and be more flexible and be more agile. The history just doesn't show that. Everybody in this room—and even Frank Kendall, who is not in this room—everybody kind of knows what you have to do to speed this up and understands it is going to be very difficult to get there because we can't do every program with the Skunk Works. We just can't do it.

So we are looking for ways that we can speed up the process, streamline it. The ranking member talked about the levels of review and oversight within the Pentagon, and then we add on top of that. And, of course, we bear some culpability for sure here in Congress because if a system is being manufactured in our district or an office is in our district, it clearly is a key national security interest, and if it is in somebody else's district, it is a bill payer. So we understand that we are part of the problem, and we need to work on that ourselves. I have been pleased to see that you all, the Pentagon, and industry has been smarter and smarter in making sure that some major component is built in everybody's district, so that makes it a little bit easier because whatever that component is, is a key national security interest, and therefore, we are going to do our part to protect it. That is the way our job is because we are looking to protect jobs in our district.

I want to go back for just a minute to the ever-name-changing Marine Corps expeditionary fighting vehicle. I remember very well because I put it there in POM 1990 in an earlier life. We could not afford that vehicle, which was called the Triple A back then, so it was always in the last year of the POM. When people, my successors came, it kept coming, and it kept going the last year of POM, and we couldn't afford it. It took every nickel of procurement Marine Corps to buy that one item, and yet it stayed in the POM year after year after year, until finally reality caught up, finally.

So part of this is, we need to live a little bit more, in my judgment, in the world of the possible, in a reality. If you can't afford it, you know you can't afford it, then why are you expending all of that energy? And I am raising my hand; I was guilty. I put it right in there because I was told how important this was. We need to do a better job—we collectively—we here and certainly those of you sitting at the table. When you are living, as we are now, in an uncertain budget time—I would argue we are always in an uncertain budget time—let's don't put our energy into doing something that we cannot afford and are not going to be able to afford. My argument to you is that is where that Triple A, which then became the expeditionary fighting vehicle and something else now, you couldn't

buy it. If you took every procurement dollar, every procurement Marine Corps dollar—that is what it took—you couldn't buy another thing. You couldn't buy a single rifle, nothing.

I think that is part of this process. We all know that the JROC [Joint Requirements Oversight Council], the whole requirements process is cumbersome, and I have heard you use today words like “long cycles” and “long cycles within cycles.” It seems to me that is what we are trying to get at here. We are trying to find ways to make those cycles not so long cycles and make them not so cumbersome and get rid of some of the layers of bureaucracy that go here.

I can never fix the fact that Mr. Turner is going to worry about some office or some production in his district. I guess I could worry about it, but I can't change it. But these processes, these bureaucratic processes—processes—we need to be getting at, and I know we want to do everything we can to clean that up as much as we can. And we have just got to stop doing business the same old way. And I know you know that, and you are trying, and if there is something in statute that needs to be changed, that is what we want to hear from you because we want to help you.

I yield back.

The CHAIRMAN. Mr. Langevin.

Mr. LANGEVIN. Thank you, Mr. Chairman.

I want to thank our witnesses, Secretary Stackley and General Williamson and Mr. Lombardi. Thank you for your testimony and for the time and attention you are putting into this area.

Obviously, we all consider acquisition reform critical if we are going to continue to maintain our technological edge going forward, as well as make better use of taxpayer dollars. We have often heard it repeated that the U.S. risks losing military technological superiority across a variety of domains if reforms are not made to improve the DOD's acquisition process. So do you believe that the current acquisition process does take so long that the technology actually becomes obsolete by the time it reaches the warfighter? On balance, is that what is happening today given——

Secretary STACKLEY. Let me describe it this way, sir, is that the pace of technology is it is outpacing our current, recent history of acquiring capability. You pointed out the acquisition process. When I think about the acquisition process, I think about everything from the start of defining a requirement to the back end of fielding the capability and supporting it in service, as opposed to that thing in the middle that sometimes people refer to that is associated with contracting actions.

It is a long and lengthy process, and much of the theme of this hearing, talking about how do we jump-start this, how do we accelerate it, much of the theme of this hearing is about taking risk upfront to try to accelerate that requirement's definition, the understanding of the requirement, and the maturing of the technologies. Let's take that risk upfront to try to collapse down some of that timeline. And then when we shift over to a more traditional development and production phase, then we are starting at a much more mature level, much better understanding of what we have to build and can, in fact, accelerate that at the same time.

Mr. LOMBARDI. Sir, I would also add to that and, again, I think one of the key attributes that will allow us to speed up in some areas will be, again, use of modular open systems architecture, which will allow us then to build in the opportunities that as emerging technology becomes available, that we will be able to integrate it more easily into the systems that we have already developed.

Mr. LANGEVIN. I think it is obviously critically important in areas in particular where procurement timelines often don't align with budget timelines, such as cyber, which moves pretty rapidly. Let me turn to, can you discuss the effectiveness of the DIUx initiative and In-Q-Tel initiatives improving access to industry and overcoming transition challenges? I know you have touched on those topics this morning, but I would like to get an update on how they are working at this point.

General WILLIAMSON. So, sir, I would like to start. I should be dancing on the table in regards to the kind of access and exposure that we are starting to see from both DIUx, but also the engagement with In-Q-Tel. I just recently spent recently an afternoon with the folks at In-Q-Tel and just the introduction to the innovative companies that, quite frankly, I had no situational awareness on and their interest now in coming into the defense space I think is going to pay tremendous dividends.

But I really discovered, though, from the DIUx side is this, I would call it a gap, quite frankly, between the companies out there who have not operated in the defense space, the normal defense space, and their understanding of the types of products, the wide range of products that we build. So we have this perception of social networking and software only, but I would tell you that their engineering talent is sufficient—it is significant, rather. So I think that we have just started to break ground, and part of this effort is to continue to expose them to the types of requirements we have. If there is a challenge, it is one that was stated earlier, and that is, so historically we have not been great customers. Their cycle times, their business processes work much faster, and as a result, it is difficult for them to understand the time it takes for us to get to yes and start building something. So it starts with exposure, and I think what we have to do on our side is make sure that we are tightening up some of the lengthy processes that we have.

Mr. LANGEVIN. Thank you.

The CHAIRMAN. Thank you.

Mr. Rogers.

Mr. ROGERS. Thank you, Mr. Chairman.

Mr. Lombardi, I would like to talk to you about the Defense Meteorological Satellite number 20, which the Air Force affectionately refers to as DMSP [Defense Meteorological Satellite Program] 20. Back in 1997, the Air Force paid industry to build this DMSP 20. Then they promptly put it in a storage facility for so long that the Air Force ultimately had to pay industry to upgrade it because it was antiquated. All the while, you paid millions of dollars a year to keep this satellite in storage. In all, the Air Force spent well over a half a billion dollars of taxpayer money on this satellite, \$518 million to be specific. Then, in 2014, the Air Force told Congress that it no longer wanted the satellite and wanted to scrap it.

Then they came back last year in 2015 and said: No, we have become too dependent on Russia and China for this meteorological information; we need to launch the satellite.

Well, unfortunately, Congress had lost confidence in the Air Force's ability to manage this program.

Mr. Lombardi, we spent \$500 million that could have been used to support national security. Instead it is going in the trash. I presume it is going to be made into razor blades. We could have saved the Air Force and the Congress a lot of aggravation if we had 18 years ago put a half a billion dollars in a parking lot in a pile and just burned it.

So my question is, why should we have any confidence that the Air Force can manage space programs when we look at this example, and what did we learn from this situation?

Mr. LOMBARDI. Sir, I would tell you that the Air Force truly does understand the space business and understands how we need to operate in space. The DMSP 20 example that you put out is an unfortunate one in which you are absolutely correct, is that we have at a point where we are not able to be able to execute that satellite. But I would tell you that the Air Force has a tremendous understanding of the entire space business, and we are dedicated to be able to continue to provide that capability for our Nation.

Mr. ROGERS. You haven't convinced us, and this is a perfect example.

In these times of austerity, when we are just struggling trying to keep the Pentagon funded—and this committee fights with the Congress constantly, trying to get adequate defense spending—this kind of example kills us. This is just an inexcusable waste.

But now moving on. And this is to any of the witnesses. We have seen a number of cases where innovative acquisition approaches have led to quick, very effective procurement of desperately needed capabilities. One of the best examples is the public-private partnerships allowed to build military family housing with minimal up-front investment from the taxpayer. We have also seen energy savings performance contracts that have allowed us to build modern buildings and leverage long-term energy savings with minimal up-front taxpayer dollars. How can we extend these types of innovative arrangements? Are there new types of innovation you believe are needed, and most specifically, what statutory authority do you need to ensure these type of arrangements receive fair consideration?

Secretary STACKLEY. Let me start. I think we referred to DIUx as an example of how we are trying to explore greater access to innovation, where we are trying to engage with a sector of our commercial technology, nontraditional for defense. We get a better understanding of what makes them successful, better understanding of what leading-edge technologies are in their hands that could provide great military utility, and perhaps more importantly is establish a longer-term relationship with this sector.

Now in doing that, we have got to overcome some challenges in-house. When we take commercial technologies and then try to convert them to a weapons system, we have different standards. That is really underlying much of the challenge that we deal with today when we talk about innovation. There are very few instances where

we can just take a commercial technology and carry it into war. But on the other hand, we have to take a hard look at the standards that we apply for our weapons systems to ensure that we are not placing excessive technical burden that would preclude—

Mr. ROGERS. You are missing my point. I am talking about taking creative approaches to financing program procurement. One of the things that I am hearing is that—CBO as well as the OMB [Office of Management and Budget]—is the problem in scoring, that we had to statutorily change the law so that the military housing could be built by private money and paid for over time. I guess I am looking for do you think we need statutory change to try to approach procurement with financing over a long period of time instead of paying for it in 1 year? Do you need some legislative authority to do that? My time is up. If you could respond in writing, I would appreciate that.

Secretary STACKLEY. I would just very shortly say that I don't think there is a broad brush, but I think what we need to do is have a discussion about the specifics of examples or initiatives that we want to attempt because there are very clear cases where scoring does stand as an impediment, and we would like to bring the case.

Mr. ROGERS. Thank you very much.

The CHAIRMAN. Ms. Sanchez.

Ms. SANCHEZ. Thank you, Mr. Chairman.

And thank you, gentlemen, for being before us. In reading through your statements and listening to some of what you have said, I am gathering that you are asking for more leeway. You are asking for more money. You are asking for less—not oversight—but less restrictions or requirements on how you spend the money. I am probably one of the few members here that gets to take a look at a lot of our classified programs where we spend, for lack of being able to talk about it in open session, billions and billions of dollars, where you have an incredible amount of leeway, lots of money, of ability to make prototypes, where it is okay to fail on our programs because we are investing for the future. We are trying new technologies. We are making new technologies. So if we would do that with more of our budget, if we would have more ability to fail, have less restrictions on the money, I think that I would see that as the American public seeing a lot more big failures from both our Pentagon and our military-industrial complex, which I think would undermine the confidence that Americans have in what we are doing with respect to defense.

And I have only to note, Mr. Chairman, the F-35 program, which was a very open program where we tried new things, like concurrently doing the development at the same time that we were producing the product, which led to \$700 billion overrun and 7 years late, and we still have a lot of problems with it.

So I am trying to understand why you want more leeway. I think we need to have actually more oversight. I think we have to have a real audit of the Defense Department. I believe we really need to tighten down in a tough budgetary environment and make real choices. Choices aren't necessarily yours. They are what we do in the Congress. That is what we are supposed to do, but I would like

you to speak to why advocate for more relaxation of requirements and regulation on how we ask you to spend this money?

Secretary STACKLEY. Let me start, ma'am. First, we are not asking for more money.

Second, it is not that we are asking for more leeway and fewer restrictions. What we want to be able to do is increase the degree of prototyping and experimentation that we can do and to shorten the timeline for developing our major weapons systems. And we want to use this limited amount of prototyping and experimentation to determine if we are on the right track for a technology or a specific technical solution to our warfighters' problem before we launch into major investment of dollars.

So we are not proposing to invest large—first off, to raise the top line, invest large dollars, and put great dollars at risk. We are talking about a limited amount of funding to determine before we invest the large dollars, before we come to the Congress and ask you all to authorize and appropriate those dollars, to see if we are on the right track.

And we are absolutely committed to doing this in broad daylight with the Congress so you have full insight and oversight to our efforts.

Ms. SANCHEZ. So, therefore, you would agree that doing something like we did with the F-35, where we were concurrently developing it and at the same time producing it, is not the way to go, to stop going toward a major system until we do a little prototype of it? Is this what you are suggesting, sir?

Secretary STACKLEY. I am absolutely not suggesting that we should be increasing the amount of concurrence that we do in terms of development and production at the same time. What we want to do is reduce the risk, mature the technologies before we get into that environment, make sure we are on the right track.

We are, in fact, doing this today in limited cases. What we want to do is make this a greater part of our practice. The limited cases where we do it, we find success, and we simply want to make that a greater part of our practice.

Ms. SANCHEZ. Well, I will have to think about that because when I look at the classified arena, we, as you know, have a lot of failures in going forward with some of those prototypes. So I don't know that we would want to do that—

Secretary STACKLEY. Yes, ma'am. What I would be happy to do is come back and walk through some examples of the prototyping that we have done that has proven successful and how we move from that to the next step, what that means in terms of dollars, what that means in terms of the process that we use and why it makes good sense. And how can we the Department working with the Congress ensure that we are achieving our mutual objectives in terms of time, in terms of money, in terms of delivering capability, insight, and oversight.

Ms. SANCHEZ. Chairman, I thank you, first of all, for the time. I think this is a very important issue for our committee to really take a look at if this is what we are become asked to do, and I think it would be very important also to get that briefing from a classified perspective to see the paths we have gone and have failed on because I think that is also a good indicator.

The CHAIRMAN. There is good, bad, and ugly examples in the classified arena, just as in the open arena.

Ms. SANCHEZ. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Wittman.

Mr. WITTMAN. Thank you, Mr. Chairman.

Gentlemen, thank you so much for joining us, and thanks for your service to our Nation. I want to begin by laying out what I think the landscape is today in acquisition in the United States military. We look at our adversaries, and we look at how they can deliver systems, how they can deliver innovation and creation through new technology, and they start out with a blank sheet of paper, with no impediments. When we start out, we have a bureaucratic structure that starts out with a paper full of noes. No, you can't do this. No, you can't do that. You can do it this way, but you can't do it that way. And when we end up in that environment, things become risk-averse. No failure is accepted. And that is a fault not only within DOD but also here on the congressional side, and we stifle the innovation and creation that we need in order to keep up with our adversaries because they don't have those impediments.

We operate in a structure today where the nirvana is to become a program of record. Instead of saying no, the nirvana needs to be to get technology to the warfighter as quickly as possible. So we are lacking innovation and creation and getting it there in a timely manner. The question then becomes, is how do we make that happen? We have all talked a lot about process here, and process is important, but let's not forget the purveyors of process. That is people. How do we empower people to make decisions, to not be so risk-averse that they say, "Listen, it is better for me not to make a decision than it is to make a decision where there is a risk or where there is a mistake that is made" and we quickly correct that mistake? How do we empower people to make sure that they are on both ends accountable and we give them the authority to say either say, "No, this isn't working, let's take a different direction," or, "Yes, this is working," or we see something out there off the shelf that we can immediately put in the hands of the warfighter to make them more successful? I would love to get your perspective on, how do we go through that empowerment process to create accountability and authority in the hands of those people that are making things happen?

Secretary STACKLEY. Let me start. I think we are on that journey. I think we have been on that journey for 40 years or longer. It is a constant challenge. I am a former program manager, and I understand what the limitations are. I understand what the pressures are. I understand what the authorities are in the hands of our program manager, and he is really at the nexus. Nobody above him understands the details as well as he does—he or she does—and nobody below him or her understands the broader picture associated with our requirements, budgeting, and procurement processes. So how do you empower them? First and foremost, make sure they are qualified. Make sure we have got the best people assigned to those positions. In fact, one of the things that we have done is we are double pumping some of our program managers. I am taking a program manager, the *Virginia*-class submarine pro-

gram manager, who served for 4 good years in that job. He is rewarded by becoming the *Ohio* Replacement program manager because that is our number one priority, and, by God, that is not a training ground. I want somebody that has been proven successful. So he is in place there, and you know what he has overseeing him, he has got me and the CNO. And we sit down regularly with him to understand the path that he is on to ensure that he has, one, our full support and the weight of our positions behind him so that the organization is responsive to him and, two, to make sure that he is on the right path.

So empowerment means first and foremost having qualified people in the positions, and we are working on that across the board. And, two, it is ensuring that the authorities, that accountability, that the line of accountability is clear and unambiguous, from the program manager [PM], PEO, the acquisition executive, service chief, and the DAE [defense acquisition executive], so that the weight of those offices and not the staff surrounding them, is supporting the PM as opposed to impeding the PM.

General WILLIAMSON. Sir, I would just like to add a couple of comments to what the Secretary said. Again, you start with making sure that you have a person who has been developed. But there is also this notion—I keep coming back to this notion of risk in the culture. So I am one of those people that actually managed a program that some would consider to have been a failure, but what we did, what I did was applied the due diligence, followed the process where appropriate, and challenged, also where it was appropriate. The difference is that I am sitting here today. So at the end of the day, you can't hatchet someone who has done the right thing, and as an organization, as an enterprise, we have to make sure that that is conveyed to our folks, that you have to be willing to take risk, but it has to be measured risk. I don't want people rolling the dice. I want people to collect data, be able to support that data, and then execute to the best of their abilities, and so that culture has to become a part of what we do.

Mr. WITTMAN. Thank you, Mr. Chairman.

I yield back.

The CHAIRMAN. Thank you.

Ms. Duckworth.

Ms. DUCKWORTH. Thank you, Mr. Chairman.

Gentlemen, thank you for being here. Headquartered in my district is Northrop Grumman's electronics systems division, and every time I visit the facility to see what they are working on, I am always impressed by how well they have leveraged the open architecture concept in what they are doing from everything that they build from cockpit upgrades for Black Hawks, to an array of surveillance systems, targeting pods, electronic countermeasures. Everyone's testimony today has laid out the importance and the value of employing open architecture systems and how it is currently being used.

But beyond that, Mr. Lombardi, perhaps you could start because in your testimony you say that despite all the great work the Air Force has underway to enable modular open systems architecture within our systems, to capture the full value of an open architecture system, we must look at new approaches. Could you share

with us what these approaches are and how this committee could be helpful in enabling this approach? And then I would also like to hear from the other witnesses too on what needs to change within the acquisition system to better enable this open architecture approach?

Mr. LOMBARDI. Thank you, ma'am. In my statement, what I was really referring to was with respect to more of our systems that are more application-centric systems that have an open architecture associated with that, and so really it was changing the dynamic of using other transaction authorities to be able to reach out and build a consortium where we could actually reach out and get people who traditionally don't play in our business, and so that was really what I was referring to with respect to we need to look at—it is another approach. It won't work for everything, and we know that, but there are certain conditions in which having OTA [other transaction authority] type of acquisitions will work because it will allow us to broaden out where we are able to look for the right kind of vendors to be able to provide us the right kind of capabilities.

Ms. DUCKWORTH. Okay.

General Williamson, perhaps you can address more directly what you think we can do to make open systems use a priority where appropriate in the design of weapons systems, and what are the impediments?

General WILLIAMSON. Yes, ma'am. I am going to give you two words. The first one is communications. That is the communications with industry, and that is the communications internally within your service for all of your programs. You have to make sure you are communicating what those standards are. As important as that word is, the real one is discipline. So just declaring that you have standards is insufficient. So everyone today, so it is very interesting, everyone today talks about open systems architecture. I don't think there is a requirement for anyone to tell us to use open architecture. You really have to do that. If you want to do things so that you have a growth potential, if you want to have competition in the future to bring in components very quickly, you have to start with an open architecture. Where I find difficulties is when we talk open systems architecture, but then we will find a component or a thing that we really like that is proprietary, and then we adjust for that. And so you have to have the discipline.

And the example I would use is something like Google. So what is very interesting is when you look at all those apps that are out there, there are hundreds of thousands of applications that are built every single day, every year, but there is a standard. If you want to build an app and you want that app to work in that environment, you follow those standards, or you don't get to play. We have to have that discipline within our own organizations, not just for the current systems but for future systems. And industry has to believe that we are going to stay with those standards.

Ms. DUCKWORTH. Good point.

Mr. Stackley, do you have anything to add?

Secretary STACKLEY. Yes, ma'am. I described in my opening remarks the Acoustic Rapid COTS Insertion program that the Navy launched into. Because we could not afford to upgrade our submarine combat systems and the threat was outpacing us, we had

to break that model. So we took an incumbent that had a sole source on our combat systems, and we broke it up. Now, that was tough because the software is the key. It is not just a hardware issue; it is a software issue. It took time to break up the software, open it, and then make it accessible to third parties to be able to compete and bring the technologies that we needed to advance our capabilities to where they are today and need to be. That model became the model for all of our systems. And so today our standard is, in fact, we have an open systems architecture standard that we drive into all of our programs. We have been on this path for about a decade. The challenge is the legacy systems. And those we upgrade by—we convert to open standards through the upgrade path. When we upgrade our existing systems, we look to open up at least that portion of the system so that future upgrades and third-party access to bring capabilities is made possible.

Ms. DUCKWORTH. Thank you.

I yield back, Mr. Chairman.

The CHAIRMAN. Thank you.

Dr. Fleming.

Dr. FLEMING. Thank you, Mr. Chairman.

Mr. Lombardi, I have a question for you, sir. I was interested to learn about the example you gave in your testimony regarding the communications and situational awareness systems developed by Air Force's S&T Program at the request of 20th Air Force and Global Strike Command. Could you please describe that particular effort and what was learned from it?

Mr. LOMBARDI. Yes, sir. Well, what that was, was again, as we were going out to—having the capability to monitor out into our missile fields, and so what this was able to do was provide a network between the UH-1 helicopters, the ground teams in the vehicles, and also at the sites themselves, to be able to communicate in a better fashion, in one in which a network that was a very capable network that we would be able to keep people informed of any incidents that were happening along any of the routes. And so it was something that our S&T folks put together in a very rapid instance and everything. And so as what we have learned from that is that, again, we can put out those self-generating types of networks on a regular basis and do it relatively easy. The issue long term we have to do is to make sure that as we do that, how do we develop out the sustainability and the support structures for those? And so that is the learning that we have to do is our S&T community does a great job in being able to provide rapid capability in certain instances, but then we have to figure out, how do we make this into a long-term, sustainable type of a system? And it causes all the “ilities” that you have to have with respect to that—the supply chain, all the sustainability and so forth. Those are the things we learn as we deploy those types of things. And then we test that, so it was something that we could use to continue to refine that capability, and so the lessons from that go back into the laboratory for them to then look at a next generation as we look to move forward into the future.

Dr. FLEMING. So this situational awareness technology would be the ability to talk and to text—

Mr. LOMBARDI. Right.

Dr. FLEMING [continuing]. Ground to air—air to ground and throughout the battle sphere, and it would seem that a lot of that is off the shelf. It may have to be adapted. Would that be the case?

Mr. LOMBARDI. A lot of it is, but a lot of it is, as a lot of the things that we do, there are a lot of things that are off the shelf. The issue is the integration associated with that, and that is where a lot of times the real magic occurs, is, how do we integrate these types of capabilities together to form a system? And so while there is a lot of things that we can do to take off the shelf, it is still a lot of the hard part is the actual integration to make them into a true system.

Dr. FLEMING. Right. How long was the prototyping process, and is there anything in your view that would have helped speed up that process?

Mr. LOMBARDI. Sir, if I could, I would like to take that for the record and get back with you on the exact timeline in which we did and if there is something we learned associated with that, if you don't mind.

[The information referred to can be found in the Appendix on page 85.]

Dr. FLEMING. Okay. Thank you.

I yield back, Mr. Chairman.

The CHAIRMAN. Dr. Wenstrup.

Dr. WENSTRUP. Thank you, Mr. Chairman.

I appreciate you all being here today. I think it has been very informative. I want to ask the general a question about the defense acquisition workforce, and I give it high marks, and I am pleased to see that because it does make a lot of sense to me to go in that direction and to have a trained workforce.

And one of the other comments I heard today was concern about our access to commercial technology because of the bureaucracy. Do you think it would be wise to work within that group, that trained workforce, for them to make recommendations to, as you called it, a tightening up of the process? I am familiar with the process. It is a good set of checks and balances, but very time-consuming and there may be steps that can be expedited or skipped. Would they be a good source to recommend changes there?

General WILLIAMSON. Sir, that is a great observation. You know we always want to reach out to the workforce. There are two areas that I think they provide a lot of insight. As you know, part of what drives the process, part of what drives the system, are really two areas: Fairness, how am I making sure that this process is fair, meets regulations? And then how am I reducing risk throughout this process? So just like on production lines out in industry, you should go to the folks who are actually doing the work and take recommendations from them.

Now, we do have some feedback mechanisms to do that, but I think to your point, that is something that we need to go back out. So I think the language that we received in this most recent NDAA gives us a lot of opportunities to improve the acquisition system. What we have to do is leverage that, go back out to the communities and see how we can improve within our own selves before we come back and ask for something else.

Dr. WENSTRUP. And I think what is attractive amongst that group is there is so much of a crossover of uniformed and civilian employees, and maybe some came from the private sector, right. And I am asking more than saying. But it seems to me that that would be a good mix of people in cooperation with the private sector folks. How can we change this system to make it still very effective, still reducing risk, but get the job done sooner?

General WILLIAMSON. Yes, sir. So I think you are right. In terms of the best practices, so your point is a good one that I need to make sure I take away. And that it is not just from the government civilians that we have as well as the uniformed, but we also have defense contractors and other folks who have a set of best practices. We always take a look at how we incorporate those, but we also have to make sure that we are looking beyond our own borders to see whether there are improvements that we could make.

Dr. WENSTRUP. Currently, do they have an opportunity to weigh in with us, the outside components?

General WILLIAMSON. I get lots of feedback from my industry partners.

Dr. WENSTRUP. I am sure you do in one way or the other, but I mean in a constructive way.

General WILLIAMSON. I think I would offer that it is probably not as formal as I think you are leaning toward. There is always a tremendous amount of interaction between program managers and their industry counterparts and then across all of the functions within a program office. I think what I would look at is, how is that done structurally in a more formal manner?

Dr. WENSTRUP. Okay. Well, I thank you very much.

I do have another question for you, Mr. Stackley. I have become aware that our only source of domestic enriched uranium and tritium, which you know you need to acquire for our nuclear subs, the DOE [Department of Energy] is going to shut that down, and we will not have a domestic source. Does that concern you from an acquisition standpoint?

Secretary STACKLEY. Sir, I am actually not aware of that.

Dr. WENSTRUP. I will follow up with you.

Secretary STACKLEY. Yes, sir. You might be referring to a company called USEC.

Dr. WENSTRUP. Formerly called.

Secretary STACKLEY. Formerly called USEC. If that is the case, that is a separate issue which I would be happy to discuss with you in detail offline.

Dr. WENSTRUP. Okay. We will pick another time. Thank you, sir.

And I yield back.

The CHAIRMAN. Mr. Coffman.

Mr. COFFMAN. Thank you, Mr. Chairman.

Mr. Lombardi, from an acquisition perspective, the past efforts of the C-130 modernization program seem to have been problematic. For example, DOD's fiscal year 2016 budget justification reflects an acquisition cost of approximately \$4.6 million per plane for the installation of the air traffic management upgrade that has already been done for commercial and other government variants of the C-130 for under \$800,000.

Can you explain why the government solution is over five times the cost, and could this be a good opportunity to look at experimentation with existing commercial solutions?

Mr. LOMBARDI. Yes, sir, it is an area where we could look at experimentation with commercial solutions. And, in fact, I believe we are. And what I would like to do, if I could, is we would like to come back with you with our plan on how we are actually going to upgrade and provide that capability into the C-130s.

We have been out on the Hill discussing with certain Members with respect to how we need to modernize and provide that capability, and we would like to be able to provide that information to you as well.

Mr. COFFMAN. Thank you. I look forward to seeing that.

And then for any of you, for all of you, the protection of intellectual property [IP] rights appears to be a significant issue in terms of successful adaptation or adoption of the open system architecture. How would you suggest a balance be reestablished between a DOD structuring of competition and industry's business models, including IP rights to recover investment in commercial and privately funded technologies?

Who wants to start with that? Mr. Stackley.

Secretary STACKLEY. I will start with that, yes, sir.

First, when you go to open systems, it is a business model and it is a technical model. And the business model brings into question the data rights associated. Our view is that if the government has paid for the development of software, the government should acquire the data rights with that software.

If somebody is bringing in software to a system that they developed, then, frankly, that is a discussion with that element of industry in terms of whether or not we, the government, feel like we need the data rights to that software, and then how would we go about acquiring that with industry.

So it is a business model. If we pay for the software development, we should be acquiring the data rights as we pay for that development. If we have failed to do so, for whatever reason, and downstream now we need to upgrade or add capability, then we are reopening a contractual discussion with that contractor in terms of data rights on the software.

So we have to be very careful that we are not chasing away industry when it comes to data rights and intellectual property, so we have to do a better job of having that dialogue and communication. But if we have paid for it, in fact, we should be acquiring the data rights with it.

Mr. COFFMAN. General.

General WILLIAMSON. Sir, if I could just add, I just wanted to add to what the Secretary said. So what I have discovered is that in many cases this gets to the communications piece. I have discovered there is a lot of urban legend about what the government owns and when you deal with them.

And so when I talked about this exposure and these communications that we are having with nontraditional defense contractors, we are finding that there is this myth that they are going to lose their IP. And case by case, you have to have that discussion. We have to do a better job of communicating.

And there are some cases where there have been specific algorithms, a specific technology that you are bringing that you should protect. And if we want it, we should pay for it. But you have to get rid of the myth first and understand the specifics of what we are talking about.

Mr. COFFMAN. Mr. Lombardi.

Mr. LOMBARDI. Yes, sir. I think what both of the panel members have said is absolutely correct, is that there is a lot of dialogue that has to occur to understand really where the myths are because we have seen that in the past where people will just say that we own the data rights. And as we peel back the onion on it, we find out whether we have or have not paid for those.

And so it is really something that we need to continue to explore, but it is a real good communication to have with the program office and the contractor to be able to really get to the meat of where the real ownership of the data really is.

Mr. COFFMAN. Okay.

Secretary STACKLEY. I will add one thing, and that is, we have become much smarter about data rights, and we are having that dialogue much earlier in the procurement process so that we are not downstreaming while hung up.

Mr. COFFMAN. Thank you, Mr. Chairman.

I yield back.

The CHAIRMAN. I will just add, if it is all a myth, you all really do have work to do, and not just on software, because the perception in industry—and this comes from some of the announcements that Mr. Kendall has made—is that DOD is going to suck up all the intellectual property, and they are going to own it forever. And it is a real issue. And I appreciate the gentleman bringing it up.

Mr. Bridenstine.

Mr. BRIDENSTINE. Thank you, Mr. Chairman.

Mr. Lombardi, according to your testimony, the Air Force views experiments as campaigns of activities rather than one-off events and focused on specific missions such as close air support and air superiority rather than specific programs of record. In most cases, if experiments are not directly tied to programs of record, my question is, how are they funded?

And as an example, how are you funding the close air support experimentation campaign?

Mr. LOMBARDI. Yes, sir. In my statement, what I was really referring to was our process on developmental planning. And so, as I have mentioned before, developmental planning is really kind of a team sport where you have the requirements, the user, the S&T community, and the acquisition community coming together before we even know that there is going to be a material solution.

So, therefore, we are not even sure that there is going to be a need for a program of record. What we are really trying to do is understand, what is the user's need, and what are the best ways to be able to approach that? It may be continuing to invest in some areas of S&T. It is starting to do some prototyping. It may be that it is just simply a CONOPS change on some technology that is already available.

And so therefore—

Mr. BRIDENSTINE. Can you help me understand, where does the funding come from?

Mr. LOMBARDI. The funding is really in our 6.4 line then, and it is what—we have a line that talks about technology transfer. And so, therefore, it is not necessarily tied specifically to a program of record yet, but it is an area where we continue to do our working to determine whether we do need a material solution or not.

Mr. BRIDENSTINE. Okay. That is good.

I want to talk specifically about one particular experimentation that has been going on as it relates to space. And that is the Joint Interagency Combined Space Operations Center [JICSpOC], which, of course, was stood up with General Hyten and Doug Loverro. And, of course, you know, Deputy Secretary Work, it was his brain child.

And I think what is happening there is critically important for our country. The idea that we can fuse all of these different sensors from the DOD to commercial industry to combined from our joint and coalition partners and other sources—the intelligence community, for example—getting all this information into one area and then experimenting to determine, you know, what are the threats that we face? How do we attribute those threats? How do we ultimately combat those threats?

Could you share with this committee as far as the JICSpOC goes, how important are those experiments, and maybe not exactly what you have learned, but how important is it that we continue doing that?

Mr. LOMBARDI. I think it is greatly important. Again, I think, as you characterized it, sir, is that both the DOD and the intel community recognize a need to have to work together to be able to share important information across the national security space enterprise.

And so by virtue of bringing the right players together, we are actually doing this experimentation, as you mentioned, that began this past October and is, I believe, going to be completing in the May timeframe. And so at least that is the first phase of it.

And from that, then General Hyten and also USSTRATCOM [U.S. Strategic Command] all will come together to kind of take a look and see, what have we learned from this? But the initial phase has really been to try and understand how the interrelationships would be and how they are moving forward.

And so as we move forward with this, I know this is an area of interest for you, is as we get to a point where we have good information to be able to come forward, I think it would be very helpful to come see you and be able to provide you an insight on where we are at.

Mr. BRIDENSTINE. Great. The transition from what we learn in these experiments—and we need to understand kind of what comes out of those experiments, learning from that and then transitioning to an operational capability, which, of course, in many cases is going to require funding that we are going to have to advocate for; I mean, that is critically important.

I have got about 31 seconds left. I want to emphasize that I would like to see the JICSpOC in the President's budget request.

I don't know if you can help with that, but those kinds of activities in there would be good.

Finally—I have got 18 seconds left—the DMSP 20, which we heard Chairman Rogers talk about, it is a big challenge. Would you be open to, for military weather purchases, purchasing data from commercial industry rather than purchasing \$500 million satellites that ultimately sometimes end up being destroyed?

Mr. LOMBARDI. I think, as we have looked at things in the past, we have used both civil and our international partners to be able to gather information with respect to weather information, so forth. And so we will continue to look at all aspects with respect to how we can provide capability to our Nation with respect to these areas.

Mr. BRIDENSTINE. Thank you, Chairman.

The CHAIRMAN. Thank you.

I appreciate you all. I think we have touched on a number of important topics today. I look forward to seeing the President's budget request, but as you can tell, the committee is not going to be content just seeing what comes over. We want to continue to work with each of you on a number of ideas and initiatives that we have to help push the whole system toward more agility.

So, with that, we, again, appreciate you all being here, and the hearing stands adjourned.

[Whereupon, at 12:15 p.m., the committee was adjourned.]

A P P E N D I X

JANUARY 7, 2016

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

JANUARY 7, 2016

Opening Statement of Chairman Mac Thornberry

"Acquisition Reform: Experimentation and Agility"

January 7, 2016

The committee begins 2016 continuing to focus our attention on defense reform to help ensure that the U.S. military is agile enough to meet the extraordinary demands of a complex, dangerous, rapidly changing world.

Last year's NDAA included important first steps in our long-term effort to reform the way the Pentagon buys goods and services. In 2016, we will build on those efforts.

Technology and threats are evolving very rapidly. Our own acquisition system too often undermines our ability to get the warfighter what he or she needs to meet and counter these threats.

Generating and validating requirements, budgeting for funds, and contracting can each take two or more years, even before major acquisition programs are initiated.

After major acquisition programs begin, it takes 8-9 years, on average, before systems are developed and deployed to warfighters.

We cannot have an agile system if it takes us years to figure out what we want, how to fund it, who to hire, even before development begins.

Today's hearing is intended to examine a number of questions and topics, but especially focusing on:

Whether experimentation and prototyping new capabilities offers a means of improving agility;

And, what successes the military's had with experimentation, as well as what obstacles the Pentagon has encountered.

And it seems to me that as one examines periods of the past where there was significant innovation in the military, experimentation was a key element, in some ways, even the heart of that innovation. It is a very critical component of where the United States needs to go.

Statement of Ranking Member Adam Smith
HEARING ON
Acquisition Reform: Experimentation and Agility
January 7, 2016

Today's hearing continues the committee's focus on improving the Pentagon's acquisition system. In particular it is focused on current Army, Navy, Air Force, and Marine Corps efforts to acquire capabilities and equipment both more quickly and in a way that allows for faster upgrades in the future. In Pentagon jargon those two goals are often called "Rapid Prototyping" and "Open Systems Architecture." Those are both worthy goals, but we do need to be careful that they are balanced with other important goals in acquisition, such as ensuring competition and avoiding wasting money by spending too much, too early, on something the DOD may not end up buying at all.

That being said, doing things more quickly is an important objective. We certainly don't want to repeat past mistakes that led to decades-long development programs like the Ford Class Aircraft Carrier, F-22, and F-35. Those programs were ramped up too quickly before requirements were understood and technologies were ready. As a result we spent more than we should have to get them, and it took way too long.

It also makes sense to build systems that can be quickly upgraded in the future. Technology moves quickly and DOD needs to be able to keep up. This is one area where I think the services are already doing a pretty good job in some areas – such as with submarine and fighter aircraft software – but there's always room for improvement.

However, to the military services' credit – and due to intervention by Congress in some cases – there have been a lot of changes in the past 10 or so years to improve the situation. All the services have established "Rapid Acquisition" organizations to get equipment to the troops more quickly. There are a lot of success stories that shouldn't be ignored as we move forward. I expect our witnesses today will remind us of some of those bright spots.

A final thing to mention is a note of caution about adding more and more legislation this year on top of the significant amount of acquisition reform legislation done in last year's NDAA. I support most of the changes we made last year, but some of them were very significant reforms that the DOD is only now starting to absorb and implement. We often chastise the DOD for constantly changing things without a solid plan in place. We here in Congress should be careful to avoid doing the same thing in this important policy area.

I look forward to today's hearing on this important issue.

RECORD VERSION

STATEMENT BY

LIEUTENANT GENERAL MICHAEL E. WILLIAMSON
PRINCIPAL MILITARY DEPUTY TO THE
ASSISTANT SECRETARY OF THE ARMY
(ACQUISITION, LOGISTICS & TECHNOLOGY)
AND DIRECTOR, ACQUISITION CAREER MANAGEMENT

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES HOUSE OF REPRESENTATIVES

ON

ACQUISITION REFORMS

SECOND SESSION, 114TH CONGRESS

JANUARY 7, 2016

NOT FOR PUBLICATION UNTIL RELEASED BY THE
COMMITTEE ON ARMED SERVICES

Introduction

Chairman Thornberry, Ranking Member Smith, and distinguished Members of the Committee on Armed Services, thank you for the opportunity to discuss the Army's continued progress in our mutual, long-term efforts at reforming the defense acquisition system in order to deploy capabilities faster to our Warfighters, control cost growth, and incentivize innovation in industry and government. It is my privilege to represent the United States Army and to offer perspectives on specific areas of interest to this Committee, including modularity and open systems architecture, rapid prototyping, and the risks associated in beginning production with immature technologies.

The objectives of acquisition reform are well-known: tackling cost and schedule growth in our acquisition programs; addressing unrealistic program requirements; streamlining a process that is bureaucratic, ponderous and slow; and addressing the need for a skilled and professional acquisition workforce. Our ultimate goal is to field a technologically superior force using a more effective, more affordable, and more responsive acquisition system.

Since its inception in 2010, the Better Buying Power initiative has been the guidebook for continuous process improvement that has resulted in significant accomplishments. It has also proved timely, as these efforts to achieve efficiency in our programs and embrace best-value business practices have helped to prepare us for the budget challenges we face now and into the foreseeable future. The success of the Better Buying Power initiative is attributable to both its comprehensiveness – looking at cost control, competition, affordability, analysis – and its timeliness.

The current iteration, Better Buying Power 3.0 (BBP 3.0), emphasizes achieving dominant capabilities through innovation and technical excellence. It addresses the growing concern that our technological superiority over potential adversaries is not assured and, in fact, is being challenged effectively.

To address this great concern, we believe that progress in our acquisition reform efforts must be balanced by the need to maintain our technological advantage. In this regard, the Army depends upon our Science and Technology (S&T) program to help us prepare for the future and maintain our decisive advantage. It is through S&T that we focus on maturing technology, reducing program risk, developing prototypes that can be used to better define requirements, and conducting experimentation with Soldiers to refine new operational concepts. The Army's S&T program is an enabler in achieving a more robust and efficient acquisition system.

Stable and Predictable Funding

Despite our efforts to improve acquisition, budgeting decisions outside of the acquisition process can greatly disrupt the development of technology priorities. Stable funding and continuity of effort take on increased importance in the S&T world. Starting and stopping programs prevents momentum in research and lengthens the timelines for discovery and innovation. Fortunately, by holding our S&T funding steady in recent years, the leadership within the Army and the Department of Defense continue to recognize the importance of ongoing S&T efforts in maintaining the military technological superiority of the United States. We are grateful to the Members of this Committee for their continued support in this area.

The Army is exploring the activation of a rapid capabilities office to address the immediate and near-term capability needs of our Warfighters through rapid Programs of Record (PoRs). While we envision a short chain of command, most likely an oversight board, with prominent Warfighter involvement from the start, our plans are in the initial stages. We expect that funding will, inevitably, be a major concern.

Prototyping and Requirement Maturation Processes for Production Starts

BBP 3.0 reinvigorates the use of prototyping and experimentation for the purpose of rapid fielding of technologically advanced weapon systems without a substantial

commitment of resources. The use of prototyping and technology maturation for the purpose of rapid fielding of technologically advanced capabilities to our Warfighters is vitally important to the Army's acquisition reform efforts. In this area, we rely heavily on our laboratories and Research, Development and Engineering Centers, comprised of a world-class cadre of roughly 12,000 civilian scientists and engineers, to target technology maturation and increase emphasis on prototyping. Both of these activities help to better inform requirements for new systems, as well as drive down the risk of integrating new technologies by demonstrating mature solutions that are technically achievable and affordable. By conducting maturation and prototyping earlier in the acquisition lifecycle, we are able to identify and address areas of risk before the Army commits more significant levels of funding to a PoR. Ultimately, it is much more cost-effective to prove out innovative concepts and capabilities in S&T rather than under formal program acquisition.

The Army has used competitive prototyping as a strategy to reduce risk, improve access to innovative technologies, and refine requirements on two key aviation programs: the Improved Turbine Engine Program (ITEP) and Future Vertical Lift (FVL). In addition, the Joint Light Tactical Vehicle (JLTV) program capitalized on the benefits of competitive prototyping during the Technology Development phase, where the efforts to multiple vendors substantially improved the fidelity of the designs and increased confidence in operational performance. The results were then used to refine the requirements through the use of cost-informed trades in close partnership with the Army and U.S. Marine Corps user communities, which yielded a set of achievable, affordable requirements.

In another area, the Army's Technology Maturation Initiative (TMI), initiated in fiscal year 2012, aligns S&T with acquisition partners in Program Executive Offices (PEOs) as well as the requirements community. These coordinated efforts prove out emerging, but needed technology components and facilitate their transition to PoRs while, at the same time, driving down acquisition costs and risks, thereby increasing success in expediting capabilities to the Warfighter. We have identified TMI priority efforts, including Assured Position, Navigation and Timing to enable Soldiers to operate in conditions that impede

or deny access to the Global Positioning System and Combat Vehicle Prototyping to ensure future acquisition program requirements are technically feasible and affordable in providing leap-ahead mobility, survivability, and lethality capabilities with reduced risk.

Additionally, to address the challenges faced in transitioning from research into a PoR, the Army has created long-term investment roadmaps across our investment portfolios. Long-range Investment Requirements Analysis (LIRA) has created an environment where the communities that invest in all phases of the materiel lifecycle work together to maximize the Army's capabilities over time and further strengthen the ties between the S&T community, their PEOs, and requirements partners.

Affordability

The Army has worked to ensure that system requirements are affordable and do not add excessive technical risk to our acquisition programs. We've instituted processes known as "Knowledge Points" to identify necessary requirements trade-offs at key decision points. This process is mandatory across all major programs and is a critical factor in achieving success. Knowledge Points allow the Army Chief of Staff and his team to formally review system requirements throughout the development phase of our programs to ensure that we make informed decisions to ensure that programs remain affordable and within acceptable ranges of technical risk.

An example is the JLTV program. During the development phase, we reviewed the system requirements and eliminated the need to airlift the vehicles in extreme conditions. This allowed us to increase the weight of the vehicle and, in turn, use less expensive material, saving roughly \$35,000 per vehicle. Also, we modified the vehicle's power generation requirement to aver the need for a new starter-generator that added technical risk and cost to the program.

Consistent with the BBP initiative, the Army has instituted affordability caps on programs when they start, to ensure that we can sustainably afford the development and production costs of a major modernization program after inception. For example,

before starting the program last year, we made sure that we could afford the Armored Multi-purpose Vehicle, at the same time we were producing the Paladin Improvement Management howitzer and JLTV.

Modular Open Systems Architecture (MOSA)

Another important aspect of acquisition reform is the Modular Open Systems Architecture (MOSA). The Army supports BBP 3.0 by emphasizing open systems architecture and modularity, with its focus on providing technical enablers and tools that can be used by the acquisition workforce and industry to enhance technology insertion, particularly where commercial technology is leading – software, sensors, microelectronics. Open architecture allows us to upgrade efficiently when technology becomes available and/or when we have a new threat to counter without starting over with an entire system. Compliance with MOSA requires software and hardware components to be effectively partitioned in their design and functioning so they can be isolated if there are problems, or swapped out with minimal effort and cost if new components become available. Benefits to our Warfighters include reducing operator learning curves by using systems that have similar functions and are operated in similar ways thereby reducing costs; increasing interchangeability; and reducing sustainment costs. The engineering trade analyses conducted prior to Milestone B help determine which system elements of program architecture can be adapted to MOSA in order to reduce program cost and development timelines.

For example, the Army is planning to develop a fleet-based approach for VICTORY, Vehicular Integration for Command, Control, Communications and Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) and Electronic Warfare (EW), integration into both emerging and legacy vehicle platforms in the near future to more easily share information, reduce weight, and save power. Testing at the Network Integration Evaluation (NIE) 15.2 last spring at Fort Bliss, Texas, demonstrated how VICTORY, using standard tools, could increase situational awareness within vehicles and across unit formations by standardizing and simplifying communication and information sharing. Getting the common electronic interfaces between vehicles and

C4ISR/EW is the thrust of VICTORY. With the common standards and interfaces provided by VICTORY, vendors will be able to build a sub-system that can “plug into” vehicles with every system presenting information to the Warfighter in the same way.

Our NIEs allow the Army to evaluate and integrate emerging technologies in a combat-relevant environment prior to deployment. Going forward, the Army will hold one NIE each year, focused on testing and evaluation of network PoRs to continue to meet testing requirements and validate yearly capability sets for delivery. To complement the NIEs, the U.S. Army Training and Doctrine Command will conduct annual Army Warfighter Assessments (AWA) at Fort Bliss to provide a more experimental environment to help shape requirements, with an emphasis on Joint and multi-national interoperability. While the NIEs have strict testing and evaluation procedures, the AWAs will be more flexible and will allow the assessment of additional capabilities to help shape requirements concepts. Both are critical parts of the Army's ongoing efforts to reform acquisition.

People and Talent Management

The acquisition community must have the ability to attract, train, and retain a qualified workforce, both uniformed and civilian. Originally recommended by the Packard Commission and inaugurated by Congress via the Defense Acquisition Workforce Improvement Act, a professionalized acquisition workforce is perhaps the largest factor within the process that contributes to success. Such a workforce is necessary to balance the technical demands of developing sophisticated weapons systems while exercising the business judgment needed to ensure value received for taxpayer resources. The Army requires access to an experienced and energetic workforce of systems engineers, logisticians, contracting personnel, and many other critical skill sets essential to ensuring successful acquisition execution.

Talent management is an Army enterprise-level effort to identify, grow, and develop our future military and civilian acquisition leaders to recognize opportunity, embrace

new ideas, manage risk, and realize their true potential. It is also about recruiting and retaining top-notch acquisition professionals to sustain the workforce through time.

Conclusion

I thank the Members of this Committee for their efforts to improve the acquisition process to better serve our Army and ultimately our Soldiers. We know that the security challenges of tomorrow will be met with the equipment we develop, modernize, and procure today. We cannot allow our own process to hinder the agility we so desperately need to maintain our technological superiority and deliver affordable capabilities to our Warfighters faster. With your help, we will continue to field the best equipment to the best Army the world has ever known in the most expeditious and cost-effective way.

Mr. Chairman, Members of the Committee, thank you for your steadfast and strong support of the outstanding men and women of the United States Army, Army Civilians, and their Families. I look forward to your questions.

LIEUTENANT GENERAL MICHAEL E. WILLIAMSON

Lt. Gen. Michael E. Williamson assumed his duties as the Principal Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT)) and Director of Acquisition Career Management on April 4, 2014.

Born in Tucson, Arizona, he was commissioned at the University of Maine as a Second Lieutenant in the Air Defense Artillery in 1983.

His earliest assignments include Chaparral Platoon Leader, Vulcan Platoon Leader, Maintenance Officer and Executive Officer in C Battery, 108th Brigade, Hahn Air Force Base, Germany. After attending the Air Defense Artillery Advanced Course, he commanded B Battery, 3/1 ADA (Hawk) in the 11th Brigade at Fort Bliss, Texas and B Battery, 3/1 ADA BN, 31st ADA BDE at Ft. Hood, Texas. His acquisition experience began as Senior Military Software Analyst at NATO's military headquarters in Mons, Belgium. After attending Command and General Staff College, Lt. Gen. Williamson served as the Chief of Information Technology, Acquisition Career Management, within the Office of the ASA(ALT). As a Congressional Fellow he served as a legislative assistant on Capitol Hill. LTG Williamson has served as Product Manager for the Global Command and Control System-Army; the Acquisition Military Assistant to the Secretary of the Army; Commander of Software Engineering Center-Belvoir; Project Manager Network Systems Integration within Program Manager, Future Combat Systems (Brigade Combat Team); Director of Systems Integration within ASA(ALT); Deputy Program Executive Officer, Integration and Joint Program Executive Officer for the Joint Tactical Radio Systems. After serving as the Assistant Deputy for Acquisition and Systems Management, Lt. Gen. Williamson was selected to be the Assistant Military Deputy to the ASA(ALT). His most recent assignment was as the Deputy Commanding General, Combined Security Transition Command-Afghanistan.

Lt. Gen. Williamson's awards and decorations include the Defense Superior Service Medal, the Legion of Merit with three Oak Leaf Clusters, the Bronze Star Medal, the Meritorious Service Medal with two Oak Leaf Clusters, the Joint Service Commendation Medal, the Army Commendation Medal with two Oak Leaf Clusters, the Joint Service Achievement Medal, the Army Achievement Medal with two Oak Leaf Clusters, and the Army Staff Identification Badge.

Lt. Gen. Williamson's education includes a Bachelor of Science from Husson College in Business Administration, a Master of Science in Material Acquisition Management from the Naval Postgraduate School and a PhD in Business Administration from Madison University. He also has graduate certificates in Public Policy from the JFK School of Government at Harvard University and the Government Affairs Institute at Georgetown University. He is a graduate of the Army Command and General Staff College, the Advanced Management Program at the Harvard Business School and was a Senior Service College Fellow at the University of Texas at Austin. Lt. Gen. Williamson is Level III certified in Program Management and Information Technology.

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THE HOUSE ARMED SERVICES COMMITTEE

STATEMENT
OF
THE HONORABLE SEAN J. STACKLEY
ASSISTANT SECRETARY OF THE NAVY
(RESEARCH, DEVELOPMENT AND ACQUISITION)
BEFORE THE
THE HOUSE ARMED SERVICES COMMITTEE
ON
ACQUISITION REFORM: EXPERIMENTATION AND AGILITY

JANUARY 7, 2016

NOT FOR PUBLICATION UNTIL RELEASED BY THE
HOUSE ARMED SERVICES COMMITTEE

Chairman Thornberry, Ranking Member Smith, and distinguished members of the Armed Services Committee, thank you for the opportunity to appear before you today to address the Department of the Navy's (DON) acquisition reform experimentation and agility initiatives.

The DON has a rich history of pushing the boundaries of science and technology to ensure our Navy and Marine Corps are equipped with the capabilities that they require to perform the full range of military operations assigned to our naval forces, in every theater, against every known threat. Our ability to maintain our maritime dominance has become increasingly difficult, however, as the complexity, risk, cost, and time to develop our weapon systems has steadily increased with each new generation of technology.

This Committee, alongside the Senate Armed Services Committee, dedicated great effort throughout the Fiscal Year 2016 budget review cycle to understand the issues and to enact the measures necessary to improve the performance of the acquisition system. As we now go about the business of implementing the provisions of the 2016 National Defense Authorization Act, the Department is committed to coordinating closely with the Congress to ensure we meet our collective, intended objectives. Likewise, we look forward to continuing our close work together as we enter the Fiscal Year 2017 budget review cycle, to identify those further measures that will improve upon the cost and time required to develop and deliver the leading edge weapon systems required by the warfighter.

To consider what improvements could be made in acquisition today, it is important to understand the environment in which it operates. Decades of well-intended legislation, regulations, and policies designed to reverse negative trends have added layers of prescriptive process and organization. These resultant prescriptive processes for acquisition programs tend to thwart rapid or even timely delivery when, in fact, the very nature of weapon systems development is risky, and the very pace of technology and of the threat demand a faster, appropriate response. Given this environment, which is not prone to agility, there is great need for experienced, knowledgeable acquisition professionals who know how to work in the unique defense marketplace, who understand the technical dimensions of extraordinarily complex systems, and who can navigate the process and organizations to produce excellent outcomes. The Department of Defense's Better Buying Power and innovation initiatives are focused on and

are making important inroads in addressing these concerns. Similarly, within the Department of the Navy, we are implementing processes to retire risk before major investment decisions need to be made, while also learning about the technologies to ensure a smooth transition into a development program.

Fundamental to the Department's efforts toward improving our acquisition outcomes is the increased use of rapid prototype development and experimentation early in a program's formulation. Early prototyping efforts jump start the capability development process and inform the development of material solutions. These prototyping and experimentation efforts are essential elements in our ability to get the requirements right; to inform critical decisions on the operational utility, technical feasibility, producibility, and programmatic risks early; and to expedite fielding of needed capability to our operational forces.

Our Sailors and Marines are equipped with the most technologically advanced systems in the world, fully capable of meeting our Nation's needs and expectations in the air, overland, and on and under the sea. The technological superiority that we enjoy today can be largely attributed to our ability to innovate, to develop and mature science and technology and transition these discoveries to advanced warfighting capabilities.

Today, the speed of innovation at the global level is increasing at an unprecedented rate. This increase is occurring both commercially and militarily due to significant worldwide advancements in science, technology and manufacturing innovations. While the DON has been at the forefront of breakthrough, innovative solutions for over 240 years, we must continue to be leaders not only in innovation, but in the speed of innovation and application of new and technologically advanced warfighting capabilities for our Sailors and Marines. We cannot be satisfied with simply maintaining technological superiority against our adversaries, but must extend our advantage to offset our adversary's growing capabilities. Prototyping and experimentation are vital mechanisms in achieving the rapid introduction of advanced, game changing technologies for our naval forces.

With this objective in mind, the DON is increasing our focus on research and development initiatives directed at rapid prototype development to address operational gaps and needs identified by Navy and Marine Corps operational forces. We are improving our alignment

across the Fleet and Marine Corps forces, and Requirements, Budgeting, and Research & Development organizations to provide a single department-wide approach, prioritize initiatives, dedicate the required resources, and to streamline the management and execution of rapid prototyping and experimentation under empowered Navy and Marine Corps leadership. Our objective is to improve the speed at which we develop and field warfare systems by leveraging increased experimentation and prototyping with Navy and Marine Corps operational forces in response to Fleet needs. We want to ‘learn fast’ through prototyping – completing projects as rapidly as possible and certainly within twenty-four months of project selection – to improve follow-on system acquisition decisions before incurring significant costs. There are four key enablers to achieving this objective.

The first enabler is leveraging the breadth and depth of technical talent and facilities from across the Naval Research & Development Establishment (NR&DE). Our Navy and Marine Corps are fortunate to have warfare centers, systems centers and laboratories which comprise the NR&DE that are equipped with world class scientists and engineers uniquely qualified to introduce solutions to complex naval warfighting problems. The NR&DE, which includes the Office of Naval Research, is positioned to leverage established relationships of the Naval S&T community, Federally Funded Research and Development Centers (FFRDCs), academia, small businesses, and the broader defense industry to execute our rapid prototype efforts. Over the last several years this combined government-industry R&D community has developed and demonstrated advanced warfighting capabilities such as the Laser Weapon System Quick Reaction Capability on USS PONCE, submarine launched unmanned aerial systems and decoys, the anti-torpedo torpedo, long range surface-to-surface engagement capabilities using existing technologies available to the Fleet, and many more. Many of these prototypes will provide substantial cost reductions in addition to capability improvements, as is the case with the High Performance Magnetic Heading Sensor for Towed Arrays where we project increased reliability and a two thirds cost reduction compared to existing sensors. The NR&DE also capitalizes on the Naval Innovative Science and Engineering (NISE) Section 219 investments that Congress has authorized to foster innovation outside traditional program lines.

The second key enabler is active and continuous engagement by our NR&DE with Fleet forces including the Warfighting Development Centers. The collective wisdom of our

operational forces and the new ideas of our young Sailors and Marines, combined with our NR&DE's understanding of complex science, technology and engineering challenges facing naval warfare, provide an incredible opportunity to change the calculus of future naval warfare. Naval Science Advisors assigned to the Fleet and Force, alongside Fleet Engagement Teams consisting of subject matter experts from across the NR&DE engaged with Fleet Commands, the Navy Warfare Development Command, Warfighting Development Centers, and the Marine Corps Combat Development Command provide a direct path connecting operational challenges, emerging warfighting concepts, and technical solutions. The Fleet Engagement Teams are able to present operational planners and fleet leadership with maturing military and commercial technologies and engineering concepts and to solicit their thoughts and views to help shape these potential innovations into future warfighting capabilities. Direct and continuous interactions between our scientists and engineers and the Sailors and Marines they support will drive innovation and, more importantly, align technical ideas with operational needs at the earliest stages in prototype development and experimentation.

The third key enabler is designing our major weapon systems for rapid technology insertion. Our ability to rapidly advance the capability of our naval forces ultimately relies upon two paths; procurement of new platforms and weapon systems, and upgrades to existing platforms and weapon systems. The more immediate effect must come through upgrades to existing platforms and weapon systems, and modular open systems designs are the key to accomplishing these upgrades in a timely and affordable manner. The success of the Navy submarine force's Acoustic Rapid COTS Insertion (ARCI) program, which provided a common, open system design for submarine combat systems and enabled the near-continuous upgrade to the systems paced by available technology and in response to advanced threats, has spurred a 'sea change' in naval systems design. In the course of the past decade, the Navy and Marine Corps have instituted modular open system design standards in the development of virtually all of our future platform and major weapon systems' designs, providing the ability to upgrade these newer systems on a timeline more responsive to emerging threats and more aligned with emerging technologies.

The fourth key enabler is funding expressly for rapid prototyping, experimentation, and demonstration. The cycle time of the budget process is arguably greater than the cycle time of

the technologies we need to leverage and, in certain cases, the cycle time of the threat we need to defeat. With a limited amount of funding expressly available for prototyping, we can respond immediately to Fleet identified gaps and/or innovative operational concepts they need to explore as opposed to submitting this request in the next budget cycle submission or, as we do in many cases, reprogramming funds from other programs. The mechanics of either programming new or reprogramming prior appropriated funds ultimately delay pursuing solutions to address Fleet needs in a timely fashion.

The current budget process is contrary to innovation and agility. In today's dynamic operational environment, other military powers and adversaries continue to introduce new capabilities that we must address. Concurrently, our scientists and engineers across the NR&DE are developing new technologies, engineering innovations and, in some circumstances, game changing capabilities that we want to introduce to the Fleet as fast as possible. We cannot afford to wait two years – our typical budget cycle time - to address our adversaries' new capabilities, nor should we wait two years to introduce our latest innovations. Prototype and experimentation funding in real time would mitigate this problem by permitting our team to act now, not two years from now.

As we move forward with this strategy, it is important to recognize that some prototypes will not demonstrate their intended capability, especially when we pursue high risk initiatives. Our view is the greater the risk, the greater the reward; yielding increases in the capability of our operational forces and widening the technological gap between our naval forces and others. In fact, it is likely that if every prototype we develop is fielded, then we are probably not taking the risks required to provide game changing technologies to our Sailors and Marines. We cannot view these occurrences as failures, but rather as learning opportunities to understand the operational utility and technical feasibility of a new concept or technology, and avoid the pitfalls and costs of entering into a formal acquisition program without full knowledge of the capability requirements and the technical and programmatic risks associated with this investment. In every case, rapid prototyping, experimentation and demonstration initiatives will directly inform Navy and Marine Corps leadership on matters related to capability needs, requirements development, and acquisition risks and strategies.

Within our abilities and in accordance with our priorities, we are pursuing rapid prototype and development initiatives today. We have and will continue to engage our sister services and other Department of Defense (DOD) agencies, where appropriate, to ensure that we are aware of and capitalizing on all DOD investments, including the Defense Innovation Initiative, DIU-X, and the Third Offset Strategy. We have already deployed Fleet Engagement Teams to discuss our approach and plans with the Fleet and to solicit their views on capability gaps and needs. We have also mobilized our NR&DE to support these efforts with their best scientists and engineers, as well as their ideas and technology and engineering innovations. We are incorporating open architecture and modular designs in our prototyping efforts, and will continue to require open architecture and modularity in our formal acquisition programs, to further enable rapid prototyping at the system and component levels and ensure technology advancements can be quickly prototyped, demonstrated and fielded. By designing our platforms and systems using open architectures, we are confident that rapid upgrades can occur that will achieve significant performance improvements at significantly less cost. Incremental enhancements through rapid prototyping can be conducted without major system integration efforts, achieving major capability improvements while minimizing technical and operational risks in the event prototypes do not achieve their projected outcome.

We are committed to fully exploiting and aggressively pursuing rapid prototyping efforts to accelerate fielding of critical warfighting capabilities and to inform, early on in the process, requirement developments and acquisition decisions. The current and future fiscal environment requires the Navy to continue to improve cost and schedule performance in acquisition programs. Rapid prototyping, experimentation and demonstration are key enablers for improving our acquisition outcomes and accelerating the affordable introduction and fielding of technologically superior weapon systems now and in the foreseeable future. We ask for support on these aspects of Acquisition Reform, for such efforts will enable the DON to drive to shorter acquisition timelines, intensify competition, and deliver the future capabilities that will ensure our dominance in projecting power, controlling the seas, deterring would-be adversaries and maintaining maritime security.

Thank you again for the opportunity to testify here today about a subject that is critical to our national security and defense. I look forward to working with the Committee in furtherance of these initiatives.

**The Honorable Sean J. Stackley
Assistant Secretary of the Navy
(Research, Development and Acquisition)
7/28/2008 - Present**

Sean J. Stackley assumed the duties of assistant secretary of the Navy (ASN) (Research, Development & Acquisition (RDA)) following his confirmation by the Senate in July 2008. As the Navy's acquisition executive, Mr. Stackley is responsible for the research, development and acquisition of Navy and Marine Corps platforms and warfare systems which includes oversight of more than 100,000 people and an annual budget in excess of \$50 billion.

Prior to his appointment to ASN (RDA), Mr. Stackley served as a professional staff member of the Senate Armed Services Committee. During his tenure with the Committee, he was responsible for overseeing Navy and Marine Corps programs, U.S. Transportation Command matters and related policy for the Seapower Subcommittee. He also advised on Navy and Marine Corps operations & maintenance, science & technology and acquisition policy.

Mr. Stackley began his career as a Navy surface warfare officer, serving in engineering and combat systems assignments aboard USS John Young (DD 973). Upon completing his warfare qualifications, he was designated as an engineering duty officer and served in a series of industrial, fleet, program office and headquarters assignments in ship design and construction, maintenance, logistics and acquisition policy.

From 2001 to 2005, Mr. Stackley served as the Navy's LPD 17 program manager, with responsibility for all aspects of procurement for this major ship program. Having served earlier in his career as production officer for the USS Arleigh Burke (DDG 51) and project Naval architect overseeing structural design for the Canadian Patrol Frigate, HMCS Halifax (FFH 330), he had the unique experience of having performed a principal role in the design, construction, test and delivery of three first-of-class warships.

Mr. Stackley was commissioned and graduated with distinction from the United States Naval Academy in 1979, with a Bachelor of Science in Mechanical Engineering. He holds the degrees of Ocean Engineer and Master of Science, Mechanical Engineering from the Massachusetts Institute of Technology. Mr. Stackley earned certification as professional engineer, Commonwealth of Virginia, in 1994.

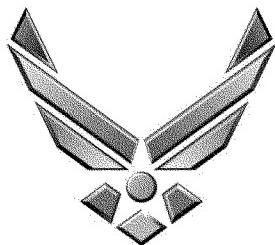
Updated: 14 January 2011

United States Air Force

Presentation

Before the House Armed Services
Committee

Acquisition Reform: Experimentation and Agility



Witness Statement of
Mr. Richard W. Lombardi, SES,
Acting Assistant Secretary of the Air
Force (Acquisition)

January 7, 2016

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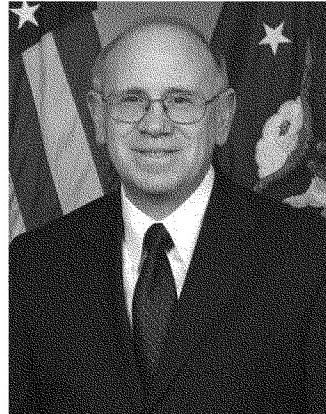
BIOGRAPHY

UNITED STATES AIR FORCE

RICHARD W. LOMBARDI

Richard W. Lombardi, a member of the Senior Executive Service, is the Principal Deputy Assistant Secretary of the Air Force (Acquisition), Washington, D.C. He is the senior civilian assistant to the Assistant Secretary of the Air Force (Acquisition). He is currently serving as the Acting Assistant Secretary of the Air Force (Acquisition).

In performing duties as the Acting Assistant Secretary of the Air Force (Acquisition), he is the Air Force's Service Acquisition Executive, responsible for all Air Force research, development and acquisition activities. Mr. Lombardi oversees a research and development, test, production and modernization program portfolio of over \$40 billion annually. He is also responsible for development and execution of policies and procedures in support of the operation and improvement of the Air Force's acquisition system.



Mr. Lombardi was born in Lowell, Mass. He entered the Air Force in 1980 after receiving his commission as a distinguished graduate of the ROTC program at the University of Lowell, Mass. Mr. Lombardi has been assigned to acquisition management positions at the Air Armament Center, Electronic Systems Center and Headquarters Air Force Systems Command, as well as acquisition logistics positions at the San Antonio Air Logistics Center. He retired from the Air Force as a colonel in July 2004 and entered federal civil service. He was appointed to the Senior Executive Service in 2005. Prior to assuming his current position, Mr. Lombardi served as Deputy Assistant Secretary for Acquisition Integration, Office of the Assistant Secretary of the Air Force for Acquisition Integration, Washington, D.C.

EDUCATION

1980 Bachelor of Science degree in accounting, cum laude, University of Lowell, Mass.
 1984 Squadron Officer School, Maxwell Air Force Base, Ala.
 1988 Master of Science degree in public administration, Western New England College, Springfield, Mass.
 1991 Program Managers Course, Defense Systems Management College, Fort Belvoir, Va.
 1993 Air Command and Staff College, Maxwell AFB, Ala.
 2001 Master of Science degree in strategic studies, Air War College, Maxwell AFB, Ala.

CAREER CHRONOLOGY

1. October 1980 - May 1983, program management analysis, Deputy for Surface Attack, Eglin AFB, Fla.
2. June 1983 - September 1984, program management analysis, Directorate for Special Projects, Eglin AFB, Fla.
3. October 1984 - September 1985, Chief, Cost Estimating, Deputy for Intelligence, Command, Control and

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- Communications Countermeasures and Support Systems, Hanscom AFB, Mass.
4. October 1985 - March 1987, executive officer, Deputy for Intelligence, C3CM and Support Systems, Hanscom AFB, Mass.
 5. April 1987 - September 1988, program manager, UHF Satellite Terminal System, Deputy for Advanced Decision Systems, Hanscom AFB, Mass.
 6. October 1988 - Sep 1989, executive officer to Chief Engineer, HQ Air Force Systems Command, Andrews AFB, Md.
 7. October 1989 - May 1990, command systems engineering manager, Deputy Commander for Support/Engineering and Technical Management, HQ AFSC, Andrews AFB, Md.
 8. June 1990 - April 1991, executive officer, DCS/Engineering and Technical Management, HQ AFSC, Andrews AFB, Md.
 9. May 1991 - July 1992, special assistant for AFMC/ Engineering and Technical Management integration, HQ Air Force Materiel Command , Wright-Patterson AFB, Ohio
 10. August 1992 - June 1993, student, Air Command and Staff College, Maxwell AFB, Ala.
 11. July 1993 - November 1993, program manager, F117 Engine, Directorate of Propulsion, Kelly AFB, Texas
 12. December 1993 - August 1995, Chief, Logistics Management Section, Directorate of Propulsion, Kelly AFB, Texas
 13. September 1995 - July 1998, Chief, Propulsion Base Realignment and Closure Implementation Office, Directorate of Propulsion, Kelly AFB, Texas
 14. July 1998 - January1999, faculty instructor and research adviser, Air Command and Staff College, Maxwell AFB, Ala.
 15. January 1999 - June 1999, Deputy Chairman, War Theory and Campaign Studies Department, Air Command and Staff College, Maxwell AFB, Ala.
 16. June 1999 - July 2000, Chairman, Joint Warfare Studies Department, Air Command and Staff College, Maxwell AFB, Ala.
 17. July 2000 - June 2001, student, Air War College, Maxwell AFB, Ala.
 18. June 2001 - June 2002, Chief, Program Integration Division, Office of the Assistant Secretary of the Air Force for Acquisition, Washington, D.C.
 19. June 2002 - February 2007, Associate Deputy Assistant Secretary for Acquisition Integration, Office of the Assistant Secretary of the Air Force for Acquisition, Washington, D.C.
 20. February 2007 - September 2008, Director, Budget Investment, Deputy Assistant Secretary for Budget, Office of the Assistant Secretary of the Air Force for Financial Management and Comptroller, Headquarters U.S. Air Force, Washington, D.C.
 21. October 2008 - July 2012, Executive Director, Electronic Systems Center, Hanscom AFB, Mass.
 22. May 2012 – August 2012, Acting Program Executive Officer for C3I and Networks, Hanscom AFB, Mass.
 23. September 2012 – April 2014, Deputy Assistant Secretary for Acquisition Integration, Office of the Assistant Secretary of the Air Force for Acquisition Integration, Washington, D.C.
 24. May 2014 – present, Principal Deputy Assistant Secretary of the Air Force (Acquisition), Washington, D.C.

AWARDS AND HONORS

- Legion of Merit
 Meritorious Service Medal with three oak leaf clusters
 Air Force Commendation Medal with oak leaf cluster
 Air Force Achievement Medal with oak leaf cluster
 Meritorious Civilian Service Award
 Meritorious Executive Presidential Rank Award

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS

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Acquisition Corps
American Society of Military Comptrollers
Air Force Association
Armed Forces Communication and Electronics Association

PROFESSIONAL CERTIFICATION

Program Management, Level III, Acquisition Professional Development Program
Financial Management, Level II, APDP

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INTRODUCTION

Chairman Thornberry, Ranking Member Smith, Members of the Subcommittee and Staff, I am pleased to have the opportunity to provide testimony on Acquisition Reform: Experimentation and Agility.

Providing *Global Vigilance, Global Reach, and Global Power* for the security of our Nation is the enduring purpose of the U.S. Air Force. To execute those critical missions, we must ensure our Airmen have what they need to be ready to meet any challenge and any threat anywhere on the globe. This is no small task in today's complex environment. As stated in the *Air Force Future Operating Concept*, "the character of warfare is becoming less predictable and more complex...No technology or technique will eliminate the metaphorical fog and friction of warfare, and no military advantage will go unchallenged by adversaries seeking to achieve their objectives and deny us ours."

We recognize the pace of change has quickened substantially over the last two decades. *Rapid change* is the new norm and has serious implications for the Air Force. The pace at which disruptive technologies may appear and proliferate will result in operational advantages that are increasingly short-lived. This rate of change will require an increasingly nimble response across the full range of disciplines, to include doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy (DOTMLPF-P).

While experimentation and rapid prototyping can expedite technology transition to the warfighter, use of these specific acquisition mechanisms must be balanced with competing warfighter needs for enduring capabilities which require supporting infrastructure, such as training, maintenance and supply chain. Herein lies the caution to rapid fielding—many of our early Air Force prototyping successes have necessitated revisiting to balance speed-to-ramp with the sustainability needed in a longer term capability. Experimentation and prototyping are key considerations in acquisition strategy

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development and in the overarching capability development framework, but they are only a piece. That said, if utilized appropriately and addressed early in the acquisition cycle, they can provide significant risk reduction to development of new and emerging technologies, potentially shortening Engineering and Manufacturing Development timelines, contributing to the early balancing of cost, schedule, and performance trades, and informing the maturation of requirements.

Our Chief of Staff, General Mark Welsh, stated in his opening to the Air Force strategy, *America's Air Force: A Call to the Future*, that our “ability to continue to adapt and respond faster than our potential adversaries is the greatest challenge we face over the next 30 years.” Uncertainty has always been a part of strategy development, and though we anticipate the pace of change to continue unabated through the next three decades, rapid change need not be a threat. While it will clearly be a vulnerability to those unable to adapt, it also becomes an enduring advantage to the agile.

In this endeavor we are supported by the committed leadership of Mr. Frank Kendall, the Under Secretary of Defense for Acquisition, Technology and Logistics (AT&L), and his emphasis on continuous process improvement. Our Air Force efforts are aligned to the Better Buying Power (BBP) 3.0 initiatives which are designed to strengthen our ability to innovate, achieve technical excellence, and field dominant military capabilities.

AGILITY IN AIR FORCE CAPABILITY DEVELOPMENT

To capitalize on the increasingly dynamic environment, the Air Force is aggressively pursuing a path toward *strategic agility*. The term *agility* is meant to capture the attributes of *flexibility*, *adaptability*, and *responsiveness*. Flexibility is the hallmark of airpower, and the adaptability of our Airmen, organizations, operational concepts, and weapon systems has long underwritten that flexibility. We seek to further imbue a culture among Airmen which demands anticipation and shaping over reaction. *Strategic* in this context refers to the security implications of how we organize, train, equip,

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and employ our Air Force...not simply for our own sake, but for the sake of the joint fight and the Nation. Embracing strategic agility will enable us to pivot more rapidly as we continue to provide the United States with effective security and influence through *Global Vigilance, Global Reach, and Global Power* beyond 2045.

While agility must permeate every level of our Air Force, the necessity is particularly acute in capability development; however, our current capability development paradigm is challenged to harness the advantages strategic agility provides. Capability development is a broad concept which encompasses our activities across many areas, the previously mentioned: doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy (DOTMLPF-P). Considerations in all of these areas are necessary to provide new capabilities to the Joint warfighter.

With sustained effort, we've improved our acquisition tradecraft and the data reflects these improvements, especially in the cost of systems; however, system acquisition is only a piece of the puzzle. Technology alone does not provide a warfighting capability—the capability comes from how the technology is used in an operational context. The acquisition community must continue to forge ever closer relationships with the operational communities, as well as technologists inside and outside of government. As an institution, we must work together to question assumptions and fully explore alternatives as to how we organize and operate, the capabilities we develop, and the methods and tools we employ to meet challenges. To do this, we are designing agility into our capability development via development planning, experimentation, and prototyping.

REINVIGORATING DEVELOPMENT PLANNING AND EXPERIMENTATION

Historically, the Air Force is credited with using development planning to drive innovation and plan its future; we are going back to our roots by reinvigorating development planning at the Air Force enterprise level to build-in agility and formulate truly innovative strategic choices. We will use

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development planning to understand and synthesize future warfighting needs and reconcile those with available and potential capabilities, concepts, and emerging technologies. It will be a key process to support Air Force strategic decisions. Core development planning functions include system-of-systems engineering to formulate and evaluate viable concepts, define the operational trade space, identify technology shortfalls and S&T needs, and assist the operational community in refining requirements. In conjunction with development planning, we will, when appropriate, conduct experimentation as part of an overall acquisition strategy to provide a credible and defendable foundation to make informed investment decisions to affordably meet Air Force operational needs.

Experimentation enables the unfettered exploration of alternatives in future environments and involves operators, technologists, requirements, acquisition professionals, and others collaborating from beginning to end in a truly integrated fashion. At its core experimentation involves asking the right questions with regard to what capabilities are necessary to cause an increase in military effectiveness in future warfare and generating the credible empirical data to answer such questions.

Campaigns of experimentation are not staged, one-off events; but a series of progressive and iterative activities, such as wargaming, modeling & simulation, and virtual and hardware prototyping, designed to build knowledge and provide a method to rapidly evaluate capability concepts that may involve using existing systems in new ways through changes in tactics, techniques, and procedures or in new combinations with other systems and enabling technologies. They entail events that explore technologies to the point of failure to enable learning. Robust experimentation and rapid prototyping are enablers that will allow the Air Force to explore implications of both disruptive technologies and employing existing systems and technologies in new ways.

On this we're working closely with AT&L's BBP 3.0 efforts to reinvigorate the use of prototyping and experimentation for the purposes of providing warfighters with the opportunity to explore novel

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operational concepts and possible solution options across the DOTMLPF-P spectrum, supporting key elements of the industrial base, incentivizing innovation in industry and government, hedging against threat developments or surprises, and reducing risk and lead time to develop and field technologically advanced weapon systems.

Critical to success is our ability to be inclusive and harness our full potential by mobilizing the talents, skills, and knowledge across disciplines and organizations within the entire Air Force from beginning to end. Furthermore we will also need our sister Services, industry, and Congress to be full partners with us as we execute future experimentation campaigns. To that point, one of our initial pilot experimentation campaigns is exploring future Close Air Support capabilities and the Air Force team has found eager participants and contributors in the Army, Navy and Marine Corps. These early successes and relationships can be learned from and built upon as we continue to move forward.

ENTERPRISE CAPABILITY COLLABORATION TEAM APPROACH

Over the past two years the Air Force made great strides to improve its strategic planning processes as evidenced by the release of a visionary Air Force 30 year Strategy and a Strategic Master Plan with clearly articulated goals and objectives. Additionally, prior to the fiscal year 2017 Program Objective Memorandum build, the Secretary and Chief of Staff initiated Enterprise Capability Collaboration Teams (ECCT) to facilitate development planning for our highest-priority mission areas.

The Air Force is using this ECCT approach to explore alternatives and formulate recommended courses of action that will inform decisions on new capability development and enterprise affordability spanning both materiel and non-materiel solutions. ECCTs bring cross-functional users of core mission areas together with requirements, acquisition and S&T communities to collaboratively examine and comprehend operational needs and then formulate and explore new multi-domain concepts and capabilities that may address those needs. ECCTs leverage knowledge and expertise residing in the Air

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Force acquisition enterprise, the DoD laboratory enterprise, Federally Funded Research and Development Centers, academia, and industry, as appropriate.

As an example, the Air Superiority 2030 ECCT is developing, exploring, and evaluating a full range of concepts to include system-of-systems and multi-domain solutions that provide kinetic and non-kinetic effects from offensive and defensive counter-air operations within an advanced threat environment. The Air Superiority 2030 ECCT is developing the details for experimentation campaigns that will explore the interplay of innovative concepts of operations and technologies across a range of operational environments to understand their feasibility and limitations. These campaigns will leverage virtual environments and rapid prototyping where applicable to accelerate progress. ECCTs have freedom to explore concepts and have a direct path to senior leadership for quicker decisions and distribution of resources, increasing agility within our enterprise. As the Air Force heads down this path, we look forward to working with the Congress on our experimentation and prototyping initiatives in exploration of newly emerging technologies and concepts.

Industry is, and will continue to be, fertile ground for cutting-edge technological development. In September, we issued a Broad Area Announcement to solicit concepts from industry in support of ECCT efforts. A recurring dialogue with industry to improve understanding of requirements and enhance competition builds a better Air Force-industry team, which is the soundest way to achieve full agility within our capability development process. A strong relationship will expose and remedy areas in which our processes and rule sets may unintentionally inhibit industry's ability to provide us with more creative solutions. As we continue to strengthen existing industry partnerships, we will also seek out non-traditional teams who are leading in the areas of innovation and agility.

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ROLE OF THE AIR FORCE S&T PROGRAM

The Air Force S&T Program plays an integral role in developing technologies to provide options for our forces of tomorrow and ensuring needed technologies get into the hands of our warfighters today. We will capitalize on the most promising S&T breakthroughs that drive greater flexibility and resilience into our weapon systems potentially leveraging simple, severable components, open architectures, rapid prototyping, and more distributed participation to develop capabilities that can encounter unforeseen threats and absorb that disturbance while retaining their basic functions and structure. Warfighting experimentation is a means to do that rapidly. Section 804 of the National Defense Authorization Act of Fiscal Year 2016, *Middle Tier of Acquisition for Rapid Prototyping and Rapid Fielding*, supports the direction the Air Force is heading, and we appreciate the authorities provided by the Congress. We are also appreciative of Section 815 of the National Defense Authorization Act of Fiscal Year 2016 because these vital changes to the other transaction authority greatly enhance our ability to perform rapid prototyping while expanding the defense supply base.

The Air Force's S&T Program is focused on developing revolutionary, relevant, and responsive technologies that address warfighter needs in the current fight. The Air Force's rapid innovation process creates novel, affordable and effective solutions to urgent near-term warfighting needs, often fielding temporary operational prototypes which mitigate the problem and provide a pathway for further development. The effort has been successful in providing effective and affordable remedies for on-going, immediate wartime challenges, with the caution that they may not be the final, long-term solution that addresses all aspects of producibility and sustainability.

For example, in response to a request from 20th Air Force and Air Force Global Strike Command, the Air Force developed and delivered a first spiral of a convoy communications and situational awareness solution. This system provides a self-configuring, self-healing mobile network that allows the

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members of a nuclear convoy to share voice and text chat messages, imagery from on-vehicle cameras (including overhead imagery from supporting UH-1N helicopters), moving map displays, and reach-back to a command and control center. As another example, in response to an urgent warfighter need received from the Combined Joint Special Operations Task Force in Afghanistan, the Air Force developed and deployed a sensor payload on a tactical remotely piloted air vehicle. This capability has been very successful in supporting numerous activities in theater and is credited with improvised explosive device detection, weapons cache identification, and enemy captured or killed. In response to the system's effectiveness, several combatant commanders have requested the systems remain in theater through calendar year 2016. Recently, an agreement was made to transition the system to the Army as a program of record starting in Fiscal Year 2017.

The Defense Rapid Innovation Program has also been an excellent means for the Air Force to communicate our areas of critical need and solicit vendors to respond with innovative technology solutions. The program has helped us strengthen the lines of communication between the Program Executive Officers, warfighters, science and technology community, and industry. We have done this under full and open competition with preference given to small businesses. We have now completed four solicitations and are in the process of making awards under the fifth solicitation. The results have been noteworthy. From the time Congress first authorized the defense rapid innovation program, the Air Force received over 3,200 white papers from 47 states in response to our topic areas. With available funding, as of December 2015, we have invited 227 proposals and made 112 awards. Additional awards will be made this spring as part of this year's cycle. Several of our projects have had significant success. For example, one of the F-35 projects invested \$2.2M to develop a nickel free material technology and is expected to save \$550M across the F-35's lifecycle. Projects are seeing scope expanded based on success and opportunity to impact other programs and weapon systems.

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ACQUISITION ENABLERS: MODULAR AND OPEN SYSTEMS ARCHITECTURES (MOSA)

Strategic agility and adaptability are foundational principles to the Air Force Strategy. The emphasis is on fielding systems more rapidly and building resilient systems that are inherently resistant to predictive failure. Best practices to achieve agility and adaptability are: use of modular systems, the use of block upgrade approaches to system fielding, and the use of open system architecture designs and standard interfaces. These techniques should help shorten development cycle times, allowing for increased performance beyond legacy systems with the more rapidly fielded “A-model” design of the system. Such systems are designed for later modular upgrades/enhancements (block upgrades) to the initial baseline design which can better manage risk and ensure schedule. The Air Force has identified Advanced Pilot Trainer (T-X) and Joint Surveillance Target Attack Radar System (JSTARS) Recapitalization as strategic agility pilots that will utilize these approaches, much as Long Range Strike Bomber (LRS-B) is already doing.

The Air Force has more programs than ever before implementing modular and open system architecture (MOSA) approaches. These include traditional ACAT programs, non-ACATs, and research projects out of the Air Force Research Laboratory. MOSA is not a binary concept where a system should be either open or closed, but rather is a spectrum of openness. Our programs, in many cases, should not be made fully open for reasons such as the impracticality of overhauling a legacy design or having competing requirements related to performance or security. Instead, the Air Force is creating an engineering culture that values incremental, meaningful, and achievable implementations within our programs. Additionally, the Air Force views MOSA as a continuous improvement activity which aligns with the BBP 3.0 initiative *“use Modular Open Systems Architecture to stimulate innovation.”* With every modernization effort, every tech refresh activity, as well as with every fresh start, MOSA will be a foundational design consideration. As perhaps our most significant example, a number of our legacy

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aircraft platforms are taking advantage of modernization efforts to determine the business case for adoption of our Open Mission System (OMS) and Unmanned Aerospace Systems (UAS) Command and Control (C2) Initiative (UCI) standards. A number of programs have adopted these standards, which have been used to reduce the schedule for integrating multiple capabilities in recent flight demonstrations. These standards are a basis for our new programs, will continue to be evaluated for further adoption in legacy platforms, and will increase our ability to respond swiftly to changing environments. In support of Section 239 of the National Defense Authorization Act of Fiscal Year 2016, the OMS-UCI group has been working to ensure it is interoperable with other standards. The Air Force-led standards are widely accepted and supported within industry and have demonstrated reductions in integration cost, timelines, and risk. Several additional platforms are studying potential implementation of OMS and UCI, including B-2, B-52, B-1, and T-X.

The Air Force also participated in the Defense Standardization Council sponsored MOSA Technical Standards Working Group this year, evaluating the sufficiency of currently available standards. A somewhat overwhelming number of standards are available to define key interfaces across all system types within the Air Force. Internally, we are working to identify a limited set of standards for our programs to consider using. In fiscal year 2018, the Air Force will establish an Open Architecture Management Office that will encourage and advocate for adoption of standards that should be used across multiple platforms within the Air Force and the Department of Defense. We are investigating enterprise-wide funding mechanisms to encourage rapid adoption of open architectures and development of common re-usable capabilities across the Air Force fleet to meet emerging threats more responsively. Despite all the great work the Air Force has underway to enable MOSA within our systems, to capture the full value of an open architecture system, we must look at new approaches. If we remain solely reliant on our traditional acquisition processes, we will not fully achieve the pace of technology refresh or the expanded competition from American industry that MOSA promises. To address these

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business-related challenges, we are prototyping a new acquisition approach, called Open System Acquisition (OSA), to enable aggressive competition toward rapid prototyping of open architecture systems. OSA utilizes other transaction authority (OTA) to create an ever-growing consortium of companies interested in working with the Air Force, with a specific focus on reaching non-traditional defense companies that otherwise wouldn't have the interest or wherewithal to do so. The goal is to streamline the acquisition process for prototype systems by leveraging live product demonstrations.

We tested this new process last year as a pilot initiative for the Air Force Distributed Common Ground System (DCGS), which is our primary intelligence, surveillance and reconnaissance (ISR) collection, processing, exploitation, analysis and dissemination (CPAD) system. Nineteen companies participated, of which 14 were non-traditional defense contractors. Participants were allowed to login to a virtual DCGS environment provided on the milcloud at Hanscom Air Force Base. The environment provided design tools, sample data, testing protocols, and a question and answer page for DCGS end-users. Companies organically formed into 13 teams and worked at their own expense to develop products that could be demonstrated at a final acquisition event called a "Plug Fest." Six teams participated in the Plug Fest last June. Three teams demonstrated a sufficiently-complete capability that we were seeking, and all three offered their products at less than 80 percent of the original government cost estimate. We ultimately awarded to two of these teams—both included non-traditional defense contractors. Our efforts are now focused on formalizing this acquisition process and applying it to a much broader sample of Air Force programs and capabilities.

CONCLUSION

Guided by the Air Force strategy, *America's Air Force: A Call to the Future*, the Air Force is transforming into a more agile enterprise to maintain—and increase—our edge in the emerging environment and leverage the full innovative potential resident in all Airmen. Experimentation can be

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the engine of development planning to generate repeatable and defendable empirical data that explores and matures truly innovative capability concepts and informs Air Force strategic decisions and planning choices. When executed in concert with the full spectrum of acquisition strategies available, development planning and experimentation campaigns can be used to explore and mature multi-domain, system-of-systems approaches to our most important operational challenges. By conducting varying and progressive levels of experimentation and prototyping, the Air Force can more rapidly conceive and evolve new system concepts and transform innovative ideas into military capabilities. Their use early in the acquisition cycle can also potentially shorten Engineering and Manufacturing Development timelines by informing the maturation of requirements, providing significant risk reduction to technology development and contributing to the early balancing of cost, schedule, and performance trades. Additionally, the use of modular and open systems architectures, standard interfaces, and the use of block upgrades approaches are means to integrate the results of experimentation and prototyping into larger weapon systems development.

A core team is being established to integrate development planning and experimentation across Air Force core mission areas and is engaging expertise and resources across the Air Force enterprise. Moreover, Air Force leadership will be able to use the timely and relevant information generated from development planning and experimentation to assess capability options for strategic decision making and guide the Air Force towards mission success, within available resources, and with acceptable risk for today and well into the future.

Chairman, Members of the Subcommittee and Staff, thank you again for the opportunity to testify today, and thank you for your continuing support of the Air Force Acquisition Enterprise.

**WITNESS RESPONSES TO QUESTIONS ASKED DURING
THE HEARING**

JANUARY 7, 2016

RESPONSE TO QUESTION SUBMITTED BY MR. WILSON

Secretary STACKLEY. In the past, DOD has funded studies on the practicality of SMR technologies for military installations which found that safety, certification, and licensing of SMR technologies take considerable lead times before deployment. In response to FY14 NDAA guidance, OSD chartered a Defense Science Board study to examine the “feasibility of deployable, cost-effective, regulated, and secure SMRs with a modest outpost of electrical power.” The OSD study is expected to review SMR deployment challenges on security, siting requirements and timelines, regulation, long term solutions for spent fuel storage, and cost. Navy Secretariat, OPNAV, and Navy Reactors subject matter experts have been actively participating in this effort. We look forward to seeing the results and recommendations coming out of this Defense Science Board study.

There are a number of licensing and operational issues that will need to be resolved before small nuclear power plants could be available for use by DOD. Recognizing this, DOD is also following advancements in SMR technologies which DOE is pursuing and will continue to collaborate with DOE as this technology advances.

As an example, DOE and the Nuclear Regulatory Commission (NRC) created a SMR Licensing Technical Support program to promote the accelerate deployment of SMRs through cooperative agreements with industry partners. The first agreement in this program was awarded to the mPower America team of Babcock & Wilcox in November 2012, and the second round of funding was awarded to NuScale Power in December 2013. NuScale expects to submit the application for design certification in the second half of 2016 and anticipates their project to be operational by 2023–2024. B&W scaled back funding for their program in April 2014 and plans to continue low-level R&D on mPower technology. DON stands ready to support the DOE and NRC as may be required. [See page 21.]

RESPONSE TO QUESTION SUBMITTED BY MR. TURNER

Mr. LOMBARDI. The contracting function of BIG SAFARI remains within the 645th Aeronautical Systems Group, Wright-Patterson AFB, Ohio (645 AESG, WPAFB), the organization that oversees the BIG SAFARI portfolio of programs. The 645 AESG Commander is appointed the System Program Manager for BIG SAFARI programs, and the contracting professionals for BIG SAFARI support the portfolio within the 645 AESG at WPAFB.

The leadership within the Air Force Life Cycle Management Center and 645 AESG are not aware of, nor are pursuing, any movement of the BIG SAFARI contracting support out of the 645 AESG at WPAFB. The current contracting function is a key ingredient in enabling BIG SAFARI to meet a multitude of users demanding mission needs in an extremely timely manner. [See page 24.]

RESPONSE TO QUESTION SUBMITTED BY DR. FLEMING

Mr. LOMBARDI. The prototype delivered to 20th Air Force and Air Force Global Strike Command was developed through the Air Force Research Laboratory (AFRL) Rapid Innovation Process, within the Air Force S&T program. After receiving authority to prototype a specific design concept from the AFRL Commander, the prototype was delivered to 20th Air Force and Global Strike Command in six months. Prior to receiving authority to proceed, the AFRL Rapid Innovation Team worked closely with the user to analyze the needs, gaps and shortfalls in order to define solution options.

In this case, the process was on target to meet the user needs. Because the user problem was framed correctly. Framing a problem correctly involves several areas, including needs decomposition, and identification of operational objectives, constraints, environment and standards. Prioritizing these efforts ensures an operationally suitable solution is identified that has a clear impact on operational effectiveness and efficiency.

User involvement in needs analysis, solution conceptualization, and prototype development enables delivery of a suitable prototype with all the right attributes to satisfy the user need. Furthermore, a rapid spiral development process that incorporates experimentation and prototyping allows the design to evolve quickly based on lessons learned during operations.

The Air Force has a successful history of developing rapid innovations to respond to senior leader-identified urgent needs. We continue to diligently refine our processes based on lessons learned over nearly a decade of such projects, and continue to carefully optimize the processes to rapidly produce cost-effective and operationally suitable prototypes. [See page 36.]

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

JANUARY 7, 2016

QUESTIONS SUBMITTED BY MR. THORNBERRY

Mr. THORNBERRY. During the hearing, witnesses expressed concern about the need for research and development funding, and additional flexibility in how funding can be used, to conduct experimentation and prototyping outside programs of record.

a. What factors limit the use of 6.4 funding (Advanced Component Development and Prototyping)? b. If more flexibility were provided so that budget requests require less specificity about experimentation and prototyping efforts, what oversight mechanisms would you employ to ensure funds are used appropriately? c. To what extent is Other Transaction Authority used in your service for experimentation and prototyping efforts? Is it an effective approach for expanding these efforts?

General WILLIAMSON. There is a long standing institutional barrier and culture of resistance to funding prototypes for concepts the Army needs to evaluate but may not buy. Prototyping for risk reduction and competition for formal programs has been more successful. The biggest barrier is that the Army does not have enough funds for the prototyping and experimentation that the Army needs to do early in the lifecycle.

A good example for governance and oversight is the Executive Steering Group that maintains oversight of the Technology Maturation Initiative program. The Technology Maturation Initiative is a prototyping, budget activity 4 account the Army stood up under the authority of the DASA(R&T) to develop prototypes to reduce technical risk, inform concepts and reduce integration challenges to programs of record. The objective of the Technology Maturation Initiative program is to facilitate the transition of priority technologies at reduced cost and risk or evaluate the concept or use of new technologies. This is done by partnering S&T with acquisition program offices to further mature, prototype and validate emerging technologies prior to Milestone B.

Army Science and Technology uses the Ground Vehicle System (GVS) Other Transaction Authority (OTA) to focus on vehicle and robotics technology research, development, test and evaluation projects. The GVS OTA mechanism facilitates collaboration and innovative technology development with industry, academia, and other Services and allows us to leverage Industry Research and Development Funding. The OTA mechanism allows a wider base of industry and academia partners to develop more rapid responses to DOD Warfighter requirements. Specifically, the Army is using this OTA for our Modular Active Protection Systems and Combat Vehicle Prototyping programs, among other efforts. Having OTA options and opportunities for prototyping opens additional possibilities to traditional contracting methods.

Mr. THORNBERRY. Witnesses stated that a culture that is open to failure is necessary to foster experimentation and innovation, and ensure DOD retains its technological edge. What steps do you suggest Congress and the services take to move the culture toward one that is more willing to accept failure?

General WILLIAMSON. As I alluded to during the hearing, if we want our potential enemies to achieve parity with regard to our technological military advantage, we should only pursue low risk technologies. To maintain our technological edge, we must be willing to accept more risk in pursuit of innovation and learn to tolerate occasional failure to that end. Today, when our brightest minds in government push the envelope and fail, it too often leads to the abrupt end of that technological pursuit. In the Services, it is increasingly difficult to defend the funding of a program perceived as marred by failure, particularly in an environment of limited resources and competing priorities. In Congress, failure is met with budget cuts or restrictive language in condemnation of a program perceived as flawed. The end result is an institutional culture that has become too risk adverse and has created perverse incentives that are driving our most innovative talent out of government and into the arms of industry.

Both the Services and Congress must first recognize that they are part of the problem, and then work hand-in-hand to encourage a culture that is more tolerant of risk and willing to accept failure, so long as it can be justified. Accountability remains paramount. Risk must be carefully calculated, our choices should be well in-

formed, and when we fail we must be able to demonstrate measurable progress toward greater goals.

Mr. THORNBERRY. During the hearing, witnesses repeatedly expressed concern about the need for the S&T, acquisition, and war fighter communities to work together early and often. What are the barriers to achieving more effective collaboration?

General WILLIAMSON. The different levels of risk tolerance across the S&T, acquisition and warfighting communities can hinder effective collaboration. I believe we have made significant progress on achieving better collaboration between the S&T, acquisition, and warfighter communities through our Long-range Investment Requirements Analysis (LIRA). The LIRA is being used within the Army to facilitate more informed program planning and budget decisions and strengthen the ties between the S&T community and their Program Executive Office (PEO) and Requirements community partners. We continue to work to refine this process, and tie in a broader set of stakeholders, such as the intelligence community, to ensure maximum collaboration across the Army.

Mr. THORNBERRY. During the hearing, witnesses expressed concern about the need for research and development funding, and additional flexibility in how funding can be used, to conduct experimentation and prototyping outside programs of record.

a. What factors limit the use of 6.4 funding (Advanced Component Development and Prototyping)? b. If more flexibility were provided so that budget requests require less specificity about experimentation and prototyping efforts, what oversight mechanisms would you employ to ensure funds are used appropriately? c. To what extent is Other Transaction Authority used in your service for experimentation and prototyping efforts? Is it an effective approach for expanding these efforts?

Secretary STACKLEY. Factors for Budget Activity BA4 (6.4), Advanced Component Development and Prototyping funds, are provided and defined by the Department of Defense Financial Management Regulations to cover efforts necessary to evaluate integrated technologies, prototype systems in a high fidelity and realistic operating environment. The intent is to expedite technology transition from the laboratory to operational use. Emphasis includes component and subsystem maturity prior to integration in major and complex systems. In addition, some BA4 (6.4) funds are tied to programs of record, so the Department of the Navy (DON) is working to establish BA4 (6.4) funds that are not aligned to programs of record to further address Fleet needs and priorities.

b. Internal to the DON, governance and oversight for rapid prototyping experimentation and demonstration (RPED) will be provided by the DON RDT&E Corporate Board. This Corporate Board is comprised of ASN (RD&A), the Vice Chief of Naval Operations, and the Assistant Commandant of the Marine Corps. The RPED process includes briefing the Corporate Board on actions being pursued as part of prototype selection. The Corporate Board will be notified of the need, the prototype, and RPED execution strategy, including financial execution. Upon identifying a prioritized Fleet need and selecting strategy and a prototyping plan, the DON will notify Congress and provide information on the identified need, the prototype being pursued, and a short summary of plan of actions and milestones.

c. In the DON, the Other Transaction Authority (OTAs) awarded or active in FY2010–FY2014 totals \$143.4 million. OTAs provide one of several contracting options for prototyping and experimentation, and will be considered when developing prototyping and experimentation strategies and plans.

Mr. THORNBERRY. Witnesses stated that a culture that is open to failure is necessary to foster experimentation and innovation, and ensure DOD retains its technological edge. What steps do you suggest Congress and the services take to move the culture toward one that is more willing to accept failure?

Secretary STACKLEY. Supporting rapid prototyping and experimentation is an important step in moving the culture in DOD. The Navy and Marine Corps leadership has embraced this idea and recognizes that even when prototyping efforts do not result in increased capability, technical insight is gained as part of the discover, develop, transition, and field cycle. It is important that Congress recognizes that every prototyping effort is an opportunity to “learn fast,” push the technological envelop, and inform requirements, budget, and acquisition decisions. This recognition will contribute to moving the culture.

Mr. THORNBERRY. During the hearing, witnesses repeatedly expressed concern about the need for the S&T, acquisition, and war fighter communities to work together early and often. What are the barriers to achieving more effective collaboration?

Secretary STACKLEY. There are no major barriers, but there are collaboration challenges typical of separate communities with different functional roles. A key element

of the DON's rapid prototyping initiative is the active and continuous interaction between the Fleet operators, planners, and requirements developers and the scientists and engineers from across the Naval Research and Development Establishment (NR&DE). Continuous interaction between these key communities enhance and expedite crucial collaboration (technical and operational), minimizing barriers to the delivery of new capabilities to the Fleet. The Fleet will be a part of senior leadership prototyping decisions and continue their involvement throughout the experimentation and demonstration phase.

An additional approach to further enhance collaboration is the use of multi-day Fleet engagement workshops involving key communities. These workshops are held prior to prototype development to explore emerging technologies, engineering innovations, and advanced warfighting concepts.

The Chief of Naval Operations recently established Warfighting Development Centers to develop advanced tactics, training and procedures, conduct training and warfighting effectiveness assessments, set and enforce performance standards, and identify and mitigate warfighting gaps. Operators from these newly established Warfighting Development Centers are integrated into the prototype development and experimentation teams to further enhance collaboration and expedite delivery of new capabilities to the Fleet.

Mr. THORNBERRY. During the hearing, witnesses expressed concern about the need for research and development funding, and additional flexibility in how funding can be used, to conduct experimentation and prototyping outside programs of record.

a. What factors limit the use of 6.4 funding (Advanced Component Development and Prototyping)? b. If more flexibility were provided so that budget requests require less specificity about experimentation and prototyping efforts, what oversight mechanisms would you employ to ensure funds are used appropriately? c. To what extent is Other Transaction Authority used in your service for experimentation and prototyping efforts? Is it an effective approach for expanding these efforts?

Mr. LOMBARDI. a. The primary limiting factors we see in the use of our 6.4 (Advanced Component Development and Prototyping) funding are institutional and cultural, both of which can be overcome through enhanced Service-wide and DOD-wide understanding. Historically, the expectation is that 6.4 funds will be used to address the technology development and maturation needs or performance requirements associated with a particular capability, according to a planned budget. Therefore, funds in this budget activity without clear or unambiguous traceability to a specific program plan and/or major shifts in the capabilities being focused on are sometimes subject to premature cuts or elimination. We're working to shift to a more agile mindset where we are able to use knowledge gained from our experimentation and prototyping efforts to inform the use of our 6.4 funding closer to and during the year of execution. We're working closely with our planning, programming, and budgeting process stakeholders to ensure the need for this type of flexibility is understood and can be communicated accordingly.

b. Air Force senior leadership provides strategic direction for our experimentation and prototyping efforts and we believe this oversight provides the requisite discipline and accountability in this spending. We will maintain transparency by ensuring that our budget documentation for these efforts clearly describes the nature and type of experimentation and prototyping activities. At the same time, the documentation will still provide us the space to explore new ideas, concepts, and technologies, with the assumption that some may not work or be feasible.

c. Currently, Other Transaction Authority is not highly utilized within the Air Force; however, we do think it could be an effective and powerful tool for our experimentation and prototyping efforts. We recently established an Other Transaction Consortium for use in acquiring open architecture systems for Air Force programs. We successfully demonstrated this with the Air Force's Distributed Common Ground System (DCGS) program and are on track to fulfill other Air Force requirements in FY 16. We plan to grow the effort in future years and are investigating other areas where we can use Other Transaction Authority.

Mr. THORNBERRY. Witnesses stated that a culture that is open to failure is necessary to foster experimentation and innovation, and ensure DOD retains its technological edge. What steps do you suggest Congress and the services take to move the culture toward one that is more willing to accept failure?

Mr. LOMBARDI. We know we cannot accept failure in carrying out our core Air Force missions critical for the security of our Nation. However, we want to emphasize that this is different than overcoming the fear of attempting difficult things, some of which may fail or turn out differently than expected. As many others have noted, we live in an era marked by great complexity and rapid change. Ensuring mission success in the future means we cannot become complacent or be afraid of

exploring new ideas and concepts. We must rigorously challenge currently accepted ways of fighting and continually learn, innovate, apply, and adapt. The Air Force must become more of a learning institution and one of the steps we're using to get us there is employment of experimentation. Experimentation enables the exploration of new concepts to understand the interplay of combinations of technologies, organizations, and employment, and doing so rapidly and cost effectively. We must not be afraid of trying out innovative ideas and failing; we must test such innovative ideas to their breaking point so we can understand weaknesses, vulnerabilities, and causes of failure. We believe instituting a culture of experimentation, with those experimentation activities supported by Congress, will help us to better learn, adapt and field the next generation of game-changing warfighting capabilities.

Mr. THORNBERRY. During the hearing, witnesses repeatedly expressed concern about the need for the S&T, acquisition, and war fighter communities to work together early and often. What are the barriers to achieving more effective collaboration?

Mr. LOMBARDI. The Secretary and Chief of Staff have initiated Enterprise Capability Collaboration Teams (ECCT) to facilitate development planning for our highest-priority mission areas. We are using this ECCT approach to break down collaboration barriers in the exploration of alternatives and formulation of recommended courses of action (COAs). These alternatives and COAs will inform decisions on new capability development and enterprise affordability spanning both materiel and non-materiel solutions. ECCTs bring cross-functional users of core mission areas together with requirements, acquisition and S&T communities to collaboratively examine and comprehend operational needs and then formulate and explore new multi-domain concepts and capabilities that may address those needs. The members of ECCTs are highly motivated, innovative and empowered. They leverage knowledge and expertise residing in the Air Force acquisition enterprise, the DOD laboratory enterprise, Federally Funded Research and Development Centers, academia, and industry, as appropriate.

QUESTIONS SUBMITTED BY MR. SHUSTER

Mr. SHUSTER. One of the concerns I have heard from my district is that there is a lack of visibility for smaller contract suppliers, and that often the relevant people at the Pentagon are not necessarily aware of the benefits or drawbacks of some smaller components purchased as part of a larger contract. Indeed, the 2012 panel on Business Challenges in the Defense Industry that I helped lead found that DOD lacks the ability to track small business participation at the lower subcontract tiers. Do you think this is still the case? And how do you believe we can properly ensure that if a smaller company makes a good product, it is properly recognized when so much of the focus is on bigger ticket items?

General WILLIAMSON. The FY14 National Defense Authorization Act provided a means for prime contractors to report small business participation at the second and third tiers, in addition to the first tier. This reporting requirement, once fully implemented, will provide greater visibility of small business participation at those levels.

As part of the Better Buying Power initiative, Program Managers (PMs) are encouraged to collaborate with the Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR) PMs to review new technology that can be incorporated into their SOR throughout its acquisition life cycle. The Army Office of Small Business Programs (OSBP) participates in the Army System Acquisition Review Council (ASARC) to advocate for maximum opportunities for small businesses throughout a system's acquisition life cycle. During ASARC meetings, OSBP encourages PMs and Contracting Officers to consider including contract incentives for prime contractors if they exceed their small business subcontracting goals.

Mr. SHUSTER. In 2012 I helped lead a panel on Business Challenges in the Defense Industry, and at the time one of the issues we discovered was that small and midsize businesses face particular challenges in contracting with the Department of Defense. At the time of the panel, DOD had been unable to meet its small business Federal procurement goals. Has this situation changed, to your knowledge, in the last three years, and what further steps do you intend to take to ensure participation of small and medium sized businesses in DOD contracting?

General WILLIAMSON. The Army is committed to contracting with small business and has achieved its statutory goals for three consecutive years. In FY15, 31.6 percent of all Army contracting actions, valued at \$17.5B were awarded to America's small businesses. The Army exceeded its annual goal of 26.5% for small business awards by 5.1 percent.

The Army led the way for DOD in achieving its statutory assigned goals for FY15. For the third consecutive year the Army met all five statutory goals. Similarly, all assigned goals in the different small business categories were exceeded; for example: the small disadvantaged business goal achieved was 15.5% exceeding the 11% goal; service-disabled veteran-owned business goal achieved was 4.75% exceeding the 3% goal; the Historically Underutilized Business-Zone goal achieved was 3.32% exceeding 3%; and the women-owned small business goal achieved was 5.85% exceeding the 5% goal.

The Army continues to focus on small business participation across the enterprise at the prime and subcontractor levels. Army small business is concentrating on outreach and increased internal advocacy for small business involvement in contracting. Focus areas include improving market research to better enable contracting personnel to find capable small businesses. The Army is also leveraging the Mentor Protégé program to foster more relationships between large and small businesses.

Mr. SHUSTER. One of the concerns I have heard from companies in my district and that was also brought to light in our panel on Business Challenges in the Defense Industry is that the ever-changing nature of the laws and regulations governing defense acquisitions can make it difficult for companies with limited resources to stay abreast of the changes that could impact their business strategies. This places larger companies with teams of contract attorneys at a competitive advantage. How do you think we can bring greater streamlining and transparency this maze of rules and regulations?

General WILLIAMSON. The implementation of Better Buying Power (BBP) focuses on many of these issues. The Army acquisition community is focused on streamlining the processes, removing barriers and investing in our acquisition workforce. The Army is working to address the complexities of acquisition to include, reexamining statutory and regulatory requirements, the reduction of which will improve responsiveness and agility.

The Army continues to leverage use of commercial items and streamlined practices to eliminate costs unique to DOD/Army in order to capitalize on existing commercial capabilities. Commercial acquisition by its nature, is streamlined and more closely resembles rules in the commercial marketplace. Army is also increasing use of its Other Transaction Authority in the areas of R&D and prototyping to attract businesses that would not otherwise do business with the Government. OTAs are not a “one size fits all” and provide relief from Federal Acquisition Regulation based rules making them more flexible and attractive methods to bring new sources of technical innovation to the Department quickly and economically.

Since the implementation of BBP, there has been a steady increase in the number of small businesses doing business with the Army, indicating an increase in streamlined arrangement. In FY15, the Army awarded 31.6 percent valued at \$17.5B to small businesses whereas in FY11 small business represented only 22 percent of eligible dollars.

Mr. SHUSTER. An issue raised by companies doing business with DOD in my district is that there is no incentive for large companies and contractors holding multiple year contracts to seek out the newest, most advanced and less expensive products, even when it would save taxpayers millions of dollars. Is there someone keeping an eye on such advancements when developing projects and upgrades, as well as allocating tax payer monies to them? If so, how do they approach this problem? Would a move to more open system architecture provide greater flexibility in this area?

General WILLIAMSON. A key tenant of Better Buying Power (BBP) initiatives is to use appropriate incentives. The Army has and continues to implement BBP initiatives and apply appropriate incentives. One example is to align profitability with contractor performance and reward successful contractors by using special incentive fee structures. The Army also makes effective use of value engineering (VE) change proposals to reduce costs, increase quality, and improve mission capability. Whether voluntary or required by Federal Acquisition Regulations, the VE program assists with saving costs as well as benefiting technology insertion.

The Army maximizes use of commercial products and services to keep pace with technology. In addition, the Army uses Other Transaction Authority (OTA), a flexible arrangement not subject to Federal Acquisition Rules, over traditional contracts to seek new technologies and innovation from industry. Use of these agreements are attractive to nontraditional contractors as well as traditional contractors as the Federal and Defense Acquisition rules do not apply. OTAs foster collaboration on the best approach for developing and leveraging commercial technology and R&D.

The Army follows the DOD open systems architecture (OSA) laid out in the Defense Acquisition System Regulations (5000 series) and structures its contract lan-

guage to target areas that foster open architecture (e.g., continuous competition, seeking data deliverables and rights in technical data). OSA is both a business and technical strategy for developing a new system or modernizing an existing one.

Mr. SHUSTER. One of the concerns I have heard from my district is that there is a lack of visibility for smaller contract suppliers, and that often the relevant people at the Pentagon are not necessarily aware of the benefits or drawbacks of some smaller components purchased as part of a larger contract. Indeed, the 2012 panel on Business Challenges in the Defense Industry that I helped lead found that DOD lacks the ability to track small business participation at the lower subcontract tiers. Do you think this is still the case? And how do you believe we can properly ensure that if a smaller company makes a good product, it is properly recognized when so much of the focus is on bigger ticket items?

Secretary STACKLEY. DOD and DON are aware of the challenge of collecting information on small business subcontracting achievements. As a starting point, the departments and agencies can determine the subcontracting dollars reported on Individual Subcontracting Report (ISR) submitted in Electronic Subcontracting Reporting System (eSRS) which is administered by GSA. However, ISR data fails to fully reflect DON's small business subcontracting achievement in terms of dollars because it does not capture orders under Basic Ordering Agreements, Blanket Purchase Agreements, SeaPort-e, or data related to Commercial Subcontracting Plans or the Comprehensive Subcontracting Plan Test Program. In addition, eSRS does not capture subcontracting by small business firms nor does it capture subcontracting efforts less than \$700,000.00, the threshold for requiring a subcontracting plan. As a result, Command specific subcontracting goals cannot be established with any accuracy and, therefore, cannot be used to establish performance metrics. There is another challenge regarding identifying which small businesses which are performing subcontracts, especially, where the prime large businesses has a subcontracting plan which covers multiple prime contracts. In December 2014, the GAO conducted a study (GAO-15-116) on this subject and concluded that actions are being undertaken to facilitate linking small business subcontractors to prime contracts (e.g. Federal Acquisition Regulation (FAR) Clause 52.204-10 which requires prime contractors to report first-tier subcontracts to small businesses of \$30,000 to the Federal Subaward Reporting System).

In an effort to improve subcontracting monitoring and compliance oversight, the DON Office of Small Business Programs (OSBP) is developing baseline performance metrics for the DOD Comprehensive Subcontracting Plan utilizing data obtained from the Defense Contract Management Agency's annually performed FAR and DFARS compliance reviews of contractors and the Contractor Performance Assessment Reporting System. It is anticipated these metrics will be in place by March 31, 2016. Additionally a subcontracting metrics initiative, utilizing eSRS data, is being developed to provide contracting officers enhanced visibility to monitor and enforce Individual Subcontracting Plan goal achievement on contracts purporting the largest DON subcontracting efforts. It is anticipated this action will be completed by the end of Fiscal Year 2016.

Mr. SHUSTER. In 2012 I helped lead a panel on Business Challenges in the Defense Industry, and at the time one of the issues we discovered was that small and midsize businesses face particular challenges in contracting with the Department of Defense. At the time of the panel, DOD had been unable to meet its small business federal procurement goals. Has this situation changed, to your knowledge, in the last three years, and what further steps do you intend to take to ensure participation of small and medium sized businesses in DOD contracting?

Secretary STACKLEY. The Department of Defense has placed special attention on the use of small business consistent with Better Buying Power initiatives and to support the White House's 23 percent small business goal. Because a significant percentage of the Department of Navy's (DON) budget is dedicated to the procurement of ships, aircraft, missiles, and combat vehicles, clearly outside small business, DOD determined the Fiscal Year 2015 DON share of the 23 percent goal to be 16 percent which DON exceeded. DON's small business performance for the last three fiscal years is as follows:

	Actual	Goals
FY13	15.11%	16.50%
FY14	16.50%	17.20%
FY15	18.57%	16.00%

The DON has taken several actions to ensure small businesses receive maximum opportunities to provide quality products, services and solutions to meet the needs of our warfighters. As an example, I issued a memorandum in January 2015 assigning each Deputy Program Manager (DPM) as the Small Business Advocate respon-

sible for identifying opportunities within their program for small business participation as well as serving as the technical point of contact for small businesses interested in pursuing these opportunities. This affects 13 Program Executive Offices and over 60 DPMs. Through collaboration, interviews, and engagement with industry a training curriculum is under development, designed to educate DPMs on their role as a Small Business Advocate. The intent is to expand the training to include all acquisition career fields. As the DON product lines move to sustainment, the goal is to track current vs. future procurement patterns to measure changed behavior.

DON's Office of Small Business Programs (OSBP) monitors the Department's performance through contract award data analysis of the ten major buying commands and the 124 subordinate buying activities, which are responsible for the acquisition of over \$80 billion in DON Procurements annually. OSBP monitors the five socio-economic categories, small business assessable markets, service portfolios, small business set-aside rate, percentage of GSA small business awards and SeaPort-e performance.

The DON is actively working the Acquisition Professional Workforce Development, a DOD initiative. This initiative redefines the professionalism of the entire small business workforce through competency analysis, education, training and establishing criteria to develop a professional and respected cadre of Small Business Professionals equipped to support the acquisition process to its fullest capability. A professional, educated small business workforce will help DON achieve its innovation initiatives and bring in non-traditional suppliers.

Major components of the program are: (1) building leadership skills (leadership development program, functional experience, developmental assignments); (2) building technical skills (formal education, acquisition training, rotational assignments, functional experience); and (3) development continuum.

Implementation initiatives include appropriate policy updates, workforce planning, standards, competency-based training, career development information and requests for requisite resources. While these professionals influence over 20 percent of DOD discretionary spending, the small business workforce had not been identified as a separate acquisition workforce functional area prior to this designation. The Director of the DON OSBP serves as the Small Business Functional Leader. The Small Business Functional Leader's vision is to transform the small business workforce into a highly skilled, business-oriented force that provides innovative, efficient, and effective influence to the Department's readiness and technological superiority.

Mr. SHUSTER. One of the concerns I have heard from companies in my district and that was also brought to light in our panel on Business Challenges in the Defense Industry is that the ever-changing nature of the laws and regulations governing defense acquisitions can make it difficult for companies with limited resources to stay abreast of the changes that could impact their business strategies. This places larger companies with teams of contract attorneys at a competitive advantage. How do you think we can bring greater streamlining and transparency this maze of rules and regulations?

Secretary STACKLEY. While the acquisition system is a maze of rules and regulations, fortunately not all of the rules and regulations result in a burden to contractors. Many involve internal operating procedures to DOD. To the extent new and evolving procurement rules affect contractors, the rules are set forth in the Federal Acquisition Regulation (FAR) and the Defense FAR (DFARS) Supplement in title 48 of the Code of Federal Regulations (CFR) and are available online. The FAR and DFARS are living documents, continuously amended to capture the new or revised laws set forth in annual authorization acts or other statutes and delete laws which are no longer in effect. The FAR and DFARS are organized into 52 chapters and are comprehensive, to the point of containing required contract clauses. In most cases, FAR or DFARS revisions are published for comment in the Federal Register. When a new statute must be implemented in a relative short period of time, FAR or DFARS coverage is issued on a temporary basis while public comments are pending.

Besides the FAR and DFARS for contracts, OMB is in the process of streamlining grants and cooperative agreement regulations for all federal agencies by consolidating them into part 2 of the CFR. DOD is now migrating its portions of its agency specific grants and agreements regulation from part 32 of the CFR to title 2.

Mr. SHUSTER. An issue raised by companies doing business with DOD in my district is that there is no incentive for large companies and contractors holding multiple year contracts to seek out the newest, most advanced and less expensive products, even when it would save taxpayers millions of dollars. Is there someone keeping an eye on such advancements when developing projects and upgrades, as well as allocating tax payer monies to them? If so, how do they approach this problem?

Would a move to more open system architecture provide greater flexibility in this area?

Secretary STACKLEY. Certain contracts specify products with well-defined requirements. These products have been qualified via demonstrated acceptable performance to fill critical warfighting needs. Other contracts are performance based, which may allow greater latitude. In either case, companies are motivated to provide products in a manner to maximize their profits. Program Managers keep an eye on advancements, continuing to monitor defense and commercial advancements in technology to better align acquisition plans.

Yes, a move to more open system architecture would provide greater flexibility in this area. Open systems architecture (OSA) has been shown to have a definite impact on the integration of new capabilities. Program managers are moving towards these practices to ensure that innovations can be adopted in both new and existing programs thereby helping to improve capability and reduce cost. The standard in the Department of the Navy is that new systems in development will be open by design.

Mr. SHUSTER. One of the concerns I have heard from my district is that there is a lack of visibility for smaller contract suppliers, and that often the relevant people at the Pentagon are not necessarily aware of the benefits or drawbacks of some smaller components purchased as part of a larger contract. Indeed, the 2012 panel on Business Challenges in the Defense Industry that I helped lead found that DOD lacks the ability to track small business participation at the lower subcontract tiers. Do you think this is still the case? And how do you believe we can properly ensure that if a smaller company makes a good product, it is properly recognized when so much of the focus is on bigger ticket items?

Mr. LOMBARDI. Although current statutory provisions do not allow us insight into lower sub contract tier data, we have increased competition and small business participation in our acquisitions. However, it is recognized that additional opportunities exist to improve competition and leverage small business across the Air Force enterprise.

Mr. SHUSTER. In 2012 I helped lead a panel on Business Challenges in the Defense Industry, and at the time one of the issues we discovered was that small and midsize businesses face particular challenges in contracting with the Department of Defense. At the time of the panel, DOD had been unable to meet its small business Federal procurement goals. Has this situation changed, to your knowledge, in the last three years?

Mr. LOMBARDI. As of 2015, the Department of Defense (DOD) is not meeting small business subcontracting goal of 34.5%. In order to meet the department-wide small business goal, the DOD Office of the Small Business Programs sets challenging, but realistic, goals for the DOD Components. The Air Force has met Office of the Secretary of Defense (OSD)-set component goals for the past two years. In FY14, the Air Force exceeded the small business prime contracting goal for the first time ever, resulting in over \$54B of contracts with small businesses and representing 23.47% of all DOD procurement funding for the fiscal year. Unofficial results for FY15 indicate the Air Force will exceed 24% of Small Business contracts for DOD procurement. Although the DOD does not assign component level small business subcontracting goals, the DOD goal is to achieve at least 34.5% subcontracting to small business from DOD prime contractors. The department also strives to meet the four aspirational socioeconomic goals, such as the 5% prime contracting with women owned small business (WOSB).

Mr. SHUSTER. What steps need to be taken to ensure participation of small and medium-size business?

Mr. LOMBARDI. To ensure participation, the Air Force Office of Small Business Programs (USAF OSBP) is expanding and improving the training provided to small business professionals, encouraging compliance with subcontracting plans and utilization of small business participation plans, and engaging in aggressive outreach to purchasing organizations to educate on small business capabilities. The USAF OSBP, in addition to continually improving internal processes and procedures in response to advances in technology, plans to improve upon and increase the number of Mentor-Protégé agreements and advocate for the use of SBIR/STTR programs.

Mr. SHUSTER. One of the concerns I have heard from companies in my district and that was also brought to light in our panel on Business Challenges in the Defense Industry is that the ever-changing nature of the laws and regulations governing defense acquisitions can make it difficult for companies with limited resources to stay abreast of the changes that could impact their business strategies. This places larger companies with teams of contract attorneys at a competitive advantage. How do you think we can bring greater streamlining and transparency this maze of rules and regulations?

Mr. LOMBARDI. The Air Force Office of Transformational Innovation (OTI) is spearheading an initiative called AQ-Cognitive Computing that will create a publicly-available information resource that utilizes advances in artificial intelligence to help navigate acquisition laws, policies, and regulations. This system will use an easy-to-understand natural language query system that will help acquisition professionals as well as the business community. Many of the barriers small businesses face when partnering with the federal government could be removed by providing this clear and intuitive system to understand the requirements of and flexibility within the DOD contracting statutes, regulations, practices, and policies.

Mr. SHUSTER. An issue raised by companies doing business with DOD in my district is that there is no incentive for large companies and contractors holding multiple year contracts to seek out the newest, most advanced and less expensive products, even when it would save taxpayers millions of dollars. Is there someone keeping an eye on such advancements when developing projects and upgrades, as well as allocating tax payer monies to them? If so, how do they approach this problem? Would a move to more open system architecture provide greater flexibility in this area?

Mr. LOMBARDI. In line with DOD's Better Buying Power 3.0 initiative, the Air Force incentivizes procurement of innovative less expensive products and services at various levels within our acquisition community. We emphasize technology insertion and refresh in program, planning, use Modular Open Systems Architecture to stimulate innovation, and utilize enhanced competition techniques such as market intelligence, pursue procurement of necessary data rights, and the development of alternate sources.

QUESTIONS SUBMITTED BY MR. COFFMAN

Mr. COFFMAN. With regards to the C-130 AMP Increment 1, can you explain why a recent RFP to pursue the required air traffic control upgrade requested a separation of integration and installation efforts? Would this sort of procurement be a good opportunity for utilizing a combined commercial approach? Finally, could you please provide an explanation of the estimated costs of the AMP-1 program?

Mr. LOMBARDI. The C-130H AMP Increment 1 strategy separates integration and installation. The separation followed several industry days and robust dialogue with industry. Based on industry response and market research indicating two or more capable small businesses, integration will be competitively awarded to a small business. Installations will be competitively awarded through the Air Force Sustainment Center's Contract Field Team (CFT) contract, which offers lower costs. CFT contractors have proven track records for similar C-130 modifications and have demonstrated ability to meet schedule requirements. While a combined commercial approach was considered utilizing the existing lower cost Air Force Sustainment Center's CFT contract offers the best value for the government.

Finally, the Air Force investigated multiple options available to reduce costs for the C-130H AMP Increment 1 effort, including procurement of mature technologies, use of existing Commercial Off-The-Shelf (COTS) solutions, and installation efficiencies. The Program Office cost estimates have been updated, leveraging industry dialogue and COTS-based solutions. This selected strategy also permitted the Air Force to accelerate the fielding of these important upgrades to meet the January 2020 mandate. Updated program funding and schedule is reflected in the Fiscal Year 2017 President's Budget.

Mr. COFFMAN. Mission success is of the upmost importance to the Department of Defense, and the Department has historically driven contracting practices to ensure quality and high performance of systems and platforms. Certification processes and military specification standards have been continually refined through lessons learned and reflect the marquee standards necessary to protect our national security interests. In some circumstances cost-saving procurement approaches featuring streamlined process and reduced bureaucracy introduce additional risk into the process. For example, last June, very shortly after a rocket was certified in an accelerated fashion by the Air Force, the rocket exploded on its very next launch attempt. This same rocket has now been re-engineered to include larger thrust, and a new propellant, yet the provider is challenging the need for a new Air Force certification of the rocket. How can DOD address the need for streamlined procurements and reduced bureaucracy without jeopardizing mission success and national security?

Mr. LOMBARDI. The DOD has a well-defined developmental process grounded in statute and implemented by DOD Instruction 5000 which allows for the balancing of Public Safety, National Security, Mission Success, Cost and Schedule concerns.

The DOD developed systems proceed through developmental and operation test programs to ensure that these systems meet the needs of the nation with maximum streamlining, minimal required bureaucracy and prudent risk taking on the part of the program managers.

Additionally, in Air Force Instruction 63-101 Acquisition and Sustainment Life Cycle Management, current Air Force policy allows acquisition program tailoring to accommodate the unique characteristics of a program while still meeting the statutory and regulatory needs for oversight and decision making and ensuring the program is able to provide the needed capability to the warfighter in the shortest practical time and balance risk.

In regards to the specific space example referenced above, National Space Transportation Policy, approved November 21, 2013, states that U.S. commercial space transportation capabilities that demonstrate the ability to launch payloads reliably will be allowed to compete for United States Government missions on a level playing field, consistent with established interagency new entrant certification criteria. The Air Force certification process is defined in the United States Air Force Launch Services New Entrant Certification Guide (NECG) published in 2011. The NECG provides a risk-based approach with four certification options based on maturity of the launch system. Despite the SpaceX launch failure June 28, 2015, SpaceX remains certified to compete for and win the award of National Security Space (NSS) missions. A failed mission does not automatically drive a revisit to a certification decision or a revocation of a certification. A launch system remains certified unless a process or design change, or some other certification factor (such as manufacturing quality, for example), causes the certification authority (SMC/CC) to determine that the launch system or provider is no longer certified.

